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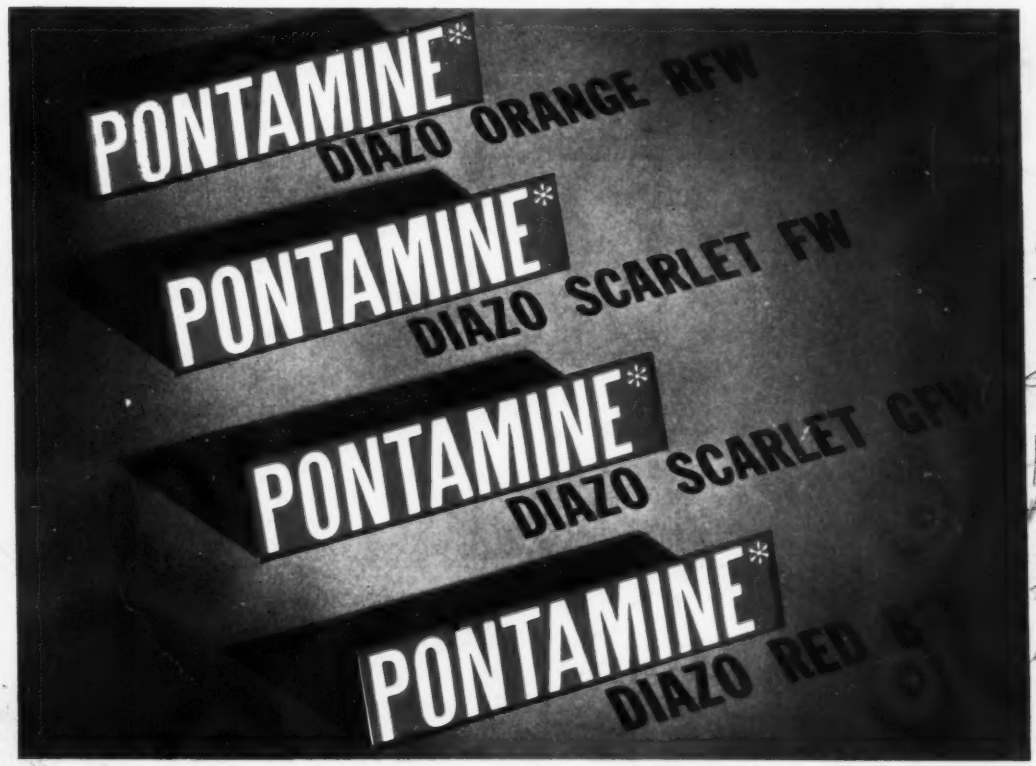
VOLUME 26 APRIL 5, 1937 NUMBER 7

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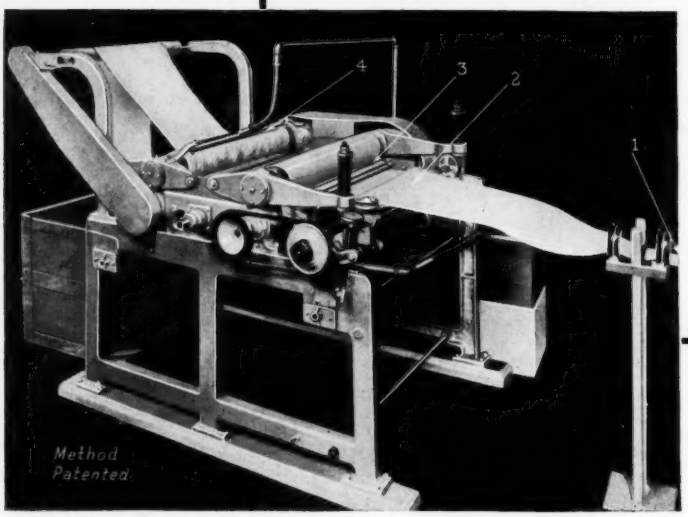


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*Official Publication of the American Association of Textile Chemists and Colorists*

THE OBJECTS OF THIS ASSOCIATION ARE:

*"To promote increase of knowledge of the application of dyes and chemicals in the Textile Industry.*

*"To encourage in any practicable ways research work on chemical processes and materials of importance to the Textile Industry.*

*"To establish for the members channels by which the interchange of professional knowledge among them may be increased."*

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VOLUME 26 APRIL 5, 1937 NUMBER 7

# Cotton Size Mixings

## *Their Purposes, Properties and Selection*

P. L. MANN

COTTON yarn when it leaves the spinning department is not in a condition to stand the strain put upon it in the loom. The principal object of sizing is to strengthen the yarn by saturating it with a starchy substance which binds the various fibers together, and gives a smooth and fairly even surface, greatly reducing the frictional action of the reed and heddles during the weaving of the yarn into cloth. Other objects are to import "feel" to the cloth, and give it additional weight.

A considerable variety of substances are found in size mixings, of which the more important are included in the following:—

(1) Substances possessing adhesive or glutinous properties, to strengthen the yarn and fix other ingredients and all loosely projecting fibers firmly upon its surface. These include wheat flour, sago, farina or potato starch, rice flour or starch, maize.

(2) Substances to render the sized yarn soft, pliable and smooth. These include tallow, grease, oils, wax, glycerine, and soap.

(3) Weighting substances, mostly china clay.

(4) Substances to destroy or prevent the growth of mildew, for which purpose zinc chloride is almost exclusively used.

(5) Deliquescent substances, to attract moisture to the sized thread, whereby it may retain its pliability and prevent the powdery substances from being rubbed off. Magnesium chloride, calcium chloride and glycerine.

Potato starch, or farina, is obtained from the tubers by reducing them to pulp and mixing with water. The water carries away the starch, and when allowed to stand the starch falls to the bottom of the vessel and the water can be drawn away. Farina is extensively used in all kinds of sizing, on account of its cheapness and the thickness of the paste it produces when boiled with water. Sago is chiefly used in light sizing, for which it is specially adapted. It is obtained from the pith of the sago palm, and made into flour by treating with water and drying on hot plates. Maize is a starch obtained from the Indian corn, and is sometimes used for lightly sizing the finer counts of cotton yarns.

### TESTING OF INGREDIENTS

Adhesive substances should be examined with respect to their color, odor, moisture, adulterations, amount of gluten, and consistency. The color is compared by placing samples side by side and flattening their surfaces so that they may be in contact with each other. A musty or mouldy smell indicates decomposition. The amount of moisture may be ascertained by weighing a sample and drying in an oven.

Mineral adulterations are left as a residue when a sample is burned over a bunsen flame; others reveal themselves when a paste is formed by boiling, and afterwards allowed to cool in a receptacle. It will then set into a firm mould, and on removing from the receptacle other ingredients are seen on the surface. The latter test is also used to ascertain the consistency or strength of flour. The firmness of the mould, tenacity of the paste, and length of time elapsing before it runs to water determining the value.

Quantity of gluten is ascertained by running water through a muslin bag containing a sample of the flour. After the water has ceased to leave the bag with a milky color, it is removed and the quantity and strength of the gluten left gives a good indication of the value of the flour.

Softeners should be examined with respect to color, hardness, specific gravity, odor, melting point; china clay and chalk for color and freedom from grit. Zinc and magnesium chlorides can only be satisfactorily tested by expert chemists.

### PREPARING SIZE

The secret of preparing size lies in the boiling. Every granule of the starch used should be opened. One of the characteristic and interesting properties of starch is that of forming a viscous fluid with hot water, which on cooling produces a paste. This results from the bursting of the granules and the absorption of water by the interior portion—known as granulose. The temperature at which the rupture takes place is known as the temperature of gelatinization and it varies with the age of the granule, and the variety of starch. Young immature granules burst first. The point of complete gelatinization for certain

varieties has been found to be wheat starch 176°F., rice 176°F., maize 167°F., farina 149°F. These figures were obtained with purified starch.

The more perfect the gelatinization the better the paste, but the quality of the paste varies with the variety of starch. Cassava and sago both produce thin paste, the former particularly so. Maize produces an opaque paste, and both maize and sago pastes can be boiled for a longer period by "open steam" without losing strength. On the other hand, farina rapidly loses its gelatinous character when so treated and liquefies, thereby losing its adhesive properties. The addition of small quantities of certain chemicals, e.g. caustic soda five per cent, increases the viscosity and gelatinous character of the paste, and also assists in its preservation. Starch will make this paste once only—if it is destroyed, no process is yet known which is capable of restoring the property of gelatinization.

Correct automatic coordination of time and temperature in size cooking is the best means of ensuring efficient gelatinization. The same viscosity of the solution can only be maintained by constant and even temperature, thus enabling proper size penetration and aiding uniform deposition.

## LIGHT, MEDIUM and HEAVY SIZING

The composition of a size mixing is determined by the nature of the yarn, its counts, weight of cloth to be woven, i.e., number of ends and picks per inch, whether the cloth is to be used in the grey state or bleached, dyed, or printed, weight to be added, feel desired and condition of the atmosphere of the weave room as regards humidity.

The various factors involved make it possible to give definite information as to proportioning size ingredients to be used, owing to the variation of their qualities and the circumstances under which they are used. So far as weaving qualities alone are concerned, and such only are necessary when the cloth is to be afterwards bleached, dyed or finished, a light size is sufficient.

For light sizing it is not necessary to use anything but wheat flour, farina, or sago, and a small quantity of softening material, usually tallow or wax. Wheat flour is fermented before using by mixing it well with water (about equal weights of each) and leaving it for several weeks, occasionally stirring to keep the particles in suspension. When flour is fermented new bodies are formed, which have a powerful influence in preventing mildew.

Softening materials are used to render the yarn more pliable. The ingredients mostly used for this purpose are tallow, wax, soap, cocoanut and palm oil. Tallows of good quality set hard and firm upon the yarn. Cocoanut and palm oils are moderately good softeners; but they melt at low temperatures, are liable to decomposition, and are dark colored; therefore they are generally used along with other softening ingredients. Paraffin waxes increase the smoothness of the sized thread, set hard upon it, and have high melting points, but they do not mix well. They should not, however, be used on goods which have subsequently to be bleached, as they are difficult to remove in bleaching processes, and cloth containing them comes up blotched after dyeing or printing. For these cloths spermaceti wax should be used.

The following mixtures are suitable for light sizing. They can be made to give greater or less percentage, according to the density of the mixture.

| | |
|---|---|
| Wheat flour ..... | 91 per cent |
| Tallow ..... | 9 per cent |

Another mixture is:

| | |
|---|---|
| Sago ..... | 31 per cent |
| Farina ..... | 59 per cent |
| Tallow ..... | 8 per cent |
| Soap ..... | 2 per cent |

A mixture which may be used for fine counts is:

| | |
|---|---|
| Farina ..... | 79 per cent |
| Wax ..... | 12 per cent |
| Tallow ..... | 9 per cent |

1 gal. of water to 1 lb. of farina

For adding weight to the cloth china clay is the chief ingredient used, because of its easy assimilation with other ingredients, and its smoothness. French chalk is better in color, but is not so heavy and is more costly. Sulfate of magnesia and sulfate of soda are chiefly used for weighting yarns which are intended for bleaching or dyeing.

For what is termed medium sizing, that is, adding about 30 to 50 per cent to the weight of the cloth, the following ingredients are used in various proportions, the proportion given being an example.

| | | |
|---|---|---|
| Flour | 66 per cent | per 150 lbs. |
| Clay | 26 per cent | per 150 lbs. |
| Tallow | 8 per cent | per 150 lbs. |
| Chloride of magnesium | 1 gallon * | |
| Chloride of zinc | ½ gallon * | |

For heavy sizing the proportions of clay and mineral ingredients are increased. In some cases over 100 per cent is added to the weight of the yarn. The adhesive ingredient most used is wheat flour, as it carries the added ingredients better than farina or sago. Sometimes two parts clay to one of flour is used for very heavy sizing.

For 100 per cent sizing the following proportions are given as an example:

| | | |
|---|---|---|
| Flour | 37 per cent | per 250 lbs. |
| Clay | 56 per cent | per 250 lbs. |
| Tallow | 7 per cent | per 250 lbs. |
| Chloride of magnesium | 5½ gallons * | |
| Chloride of zinc | 2½ gallons * | |

It will be noticed that chloride of magnesium and chloride of zinc are introduced along with china clay. Chloride of magnesium is a powerful softener as well as a weighting material, and one of its uses is to prevent the gritty feel which the addition of clay alone would give to the cloth. It has a great affinity for water, and has thus the power

* Both Chloride of Magnesium and Chloride of Zinc are commercially sold in the liquid form. The percentage of the chloride varying from as low as 30% in some cases to as high as 45%. The above recipe is based upon a product approximating 40-45% of the content.

of attracting moisture to the cloth in which it is used. It is this which constitutes its softening effect.

With a size containing flour, clay and tallow only, there is a tendency towards the development of mildew. It is liable to develop at any time, either during the manufacture of the size, the weaving of the cloth, or even after a considerable lapse of time from its completion and delivery. In its first stage it may be removed from the fabric by washing, without leaving stain or injury; in the second stage it may be washed off, but leaves a stain or discoloration; and in the third stage it attacks the fiber and weakens the fabric to a considerable extent.

The use of chloride of magnesium as a softening agent attracts moisture, and it becomes necessary to use an antiseptic which will counteract the tendency of the cloth to mildew. Chloride of zinc has been found most satisfactory, and a sufficient quantity of this substance included in a size composition will effectually prevent or destroy the formation of such vegetable growth. Chloride of calcium has a similar effect to chloride of magnesium, but is scarcely as powerful. It may be used, however, in light sizings to prevent the yarn becoming too brittle.

Both hard and soft soaps may be used in size mixings. They dissolve fatty ingredients, and cause them to mix well. They have also the effect of causing china clay to boil thin, and prevent its spurting. But if used with the chlorides of magnesium, zinc or calcium, the size is liable to become lumpy, and the antiseptic properties are interfered with.

Soda may be added in small quantities to neutralize any free acid given off in the mixing and prevent the formation of iron mould. Coloring matters may be used in size to give the yarn any desired tinge.

The yellowness of the cloth given in heavy sizing may be prevented by the addition of a suitable tinting blue; ultramarine, indigo sulfate, or a basic dyestuff.

## Review of U. S. Patents Covering

# Silk Weighting

## *(1915-1935)*

ELLERY H. HARVEY

THIS review covers changes in the art of weighting silk during the past twenty years as recorded in United States patents. Care has been exercised in the compilation to reproduce the claims in substantially the same language as that employed in the patents.

Just as the secrecy surrounding the development of tin weighting silk, and later fixing of the tin on the fiber with phosphoric acid, and still later the silicate method of weighting, prevented the discoverer's names from becoming known, so today a review of patent literature while highly important, may not necessarily reflect true conditions in the industry. With such a variety of methods from which to choose and the significance of changes of detail not being known, it seems to the writer that the wholesale condemnation of "weighting," without stipulating what kind of weighting, is unscientific, not to say, unfair.

**1,154,174**

Composition of Matter for Weighting Silk Yarns and Fabrics.

Emile Butte. September 21, 1915.

A composition of matter for weighting silks consisting of the reaction product of: Sodium carbonate, 1 pound; Hydrochloric acid, ½ pint; Sugar, 6 ounces; Sulfuric acid, 2½ tablespoons; Water, 1 pint.

Can be applied after dyeing by single submersion.

**1,173,195**

Loaded Silk and Process of Loading the Silk.

Ignatz Kreidl. February 29, 1916.

A process of loading silk consisting in dipping silk into a solution of a salt of zirconium, and subjecting said treated silk to a fixing bath. Salts of thorium, cerium and ytterium may also be employed.

**1,173,196**

Loaded Silk and Process of Loading the Silk.

Ignatz Kreidl. February 29, 1916.

In the loading of silk, a process consisting of saturating the silk with a solution of mixed colloidal hydrates of the rare earth metals, the hydrates being those which do not readily attack the silk, and the metal constituent having a high atomic weight. Zirconium, ytterium and cerium are mentioned.

**1,193,429**

Metal Chloride Bath for Weighting Silk.

Peter Schmid and Karl Gross. August 1, 1916.

A metal chloride bath for weighting silk comprising a solution of at least one metal chloride with silk and silkworm chrysalides, the said metal chloride being the chloride of a metal able to be fixed on the silk fiber by an alkali metal phosphate bath. This makes possible use of a mixture of zinc chloride and tin chloride, which gives good results at lower cost.

**1,207,784**

Process of Weighting Silk with Haematoxylin.

Franz Mueller. December 12, 1916.

A process of weighting silk consisting in giving the silk a preliminary weighting; manipulating the silk at about 50° C. in a bath of 100 parts haematoxylin and 50 parts sodium phosphate; and gradually increasing the temperature of the bath until the desired weighting is obtained.

This process gives a higher percentage of weighting without other disadvantages, and the weighted silk is firmer.

**1,207,800**

Process for Weighting Silk.

Peter Schmid and Karl Gross. December 12, 1916.

Process for weighting silk by treating it alternately with metal chloride baths and alkali metal phosphate baths and subsequently with an alkali metal silicate bath, the said metal chloride being a chloride of a heavy metal and capable of being fixed upon the silk fiber by an alkali metal phosphate, the use of the alkali metal phosphate baths and of the alkali metal silicate bath in the form of froth or foam baths. This process prevents the bath from becoming too alkaline which dissolves off the tin.

**1,231,436**

Apparatus for the Weighting of Silk Filaments and Silk Fabrics in Form of Hanks.

Peter Schmid. June 26, 1917.

An apparatus for the weighting of silk filaments or silk fabrics in form of hanks, comprising a vat having in its upper part a row of horizontal tiltable hank supports provided on the one hand with spraying tubes arranged above the hank supports in such a manner that all may be turned back together, and on the other hand with spraying tubes placed underneath the aforesaid hank supports, of which latter tubes each is connected with the corresponding hank support and can be turned back with it.

**1,238,307**

Weighting of Silk.

N. A. Laury. August 28, 1917.

Antimony sodium double chloride is dissolved in water so that the solution has a specific gravity of 30° Be at 60° F. Soak the silk for 1 hour, then wash in cold water. Silk is then constantly agitated for 45 minutes at 160° F. in 8° Be sodium phosphate solution. Wash in cold water. Agitate silk for 1 hour in an 8° Be sodium silicate solution. Wash in cold water. Next soak silk in a 10° Be aluminum sulphate solution for 1 hour. Dry.

**1,259,526**

Apparatus for Weighting and Washing Silk Pieces.

F. J. B. Knibiehler and A. Fankhauser. March 19, 1918.

A plant for charging and the like of silk pieces, comprising a sucking and pumping apparatus, a centrifugal drying apparatus, a fabric winding apparatus, a reservoir containing a bath of stannic chloride, and a washing apparatus, all of said apparatuses being so constructed and correlated that the metal drums and acid proof drums, upon which the fabric to be treated is rolled, may be taken out of one of said apparatus and put into another one.

**1,263,126**

Silk Dyeing.

Sigmund Saxe. April 16, 1918.

First work the silk in a bath of nitrate of iron and treat with ferrocyanid or the like to produce a blue; then work the silk in a strong extract of osage orange, about 51° Twaddell. Tin crystals may be added. The silk absorbs a large amount of solid matter and is weighted about 50%. Then add pyrolignite of iron and dye in the usual manner to produce a black.

Process produces a jet black and has a better merchantable weight.

**1,352,014**

Process of Dyeing Raw Silk.

Eugene L. Maupai. September 7, 1920.

Saturate the silk with a metallic salt, diluted in water, such as chrome chloride, iron liquor or alum, thus producing a hardening of the substances contained in and around the silk threads. Wash and dye with vat colors and weave. Wash in soap or alkali such as in degumming silk.

Process makes silk resistant to the action of strong acids or alkali, thus making vat dyeing possible.

**1,417,206**

A Process for Weighting or Charging Silk to be Dyed Black.

A. W. Schmid. May 23, 1922.

100 Kg of silk are suspended in a bath of boiling lather or froth, prepared with 2000 L of water, 70 Kg of haematein and 20 Kg of chrysalides previously boiled up in 50 L of water, the liquid bath being heated to produce boiling foam or froth according to the well known process now generally used for the degumming and the tin-phosphate weighting of silk. The silk is treated with this bath of boiling lather for 15-30 minutes. 10 Kg of potassium silicate may be added. The exhausted bath can then be mixed with weak water and aniline dye and the silk can be dyed in the froth, or it can be dyed subsequntly in a separate bath of aniline dye. Process claimed to:

Be of shorter duration;
Feeble volume of liquid bath employed;
Avoidance of impairing of the silk;
Smooth stretched threads;
High weighting.

**1,446,834**

Process of Treating Silk.

George W. Cole, Jr. February 27, 1923.

160 pounds raw silk placed in the following bath at 28° C. for 1 to 1½ hours to remove all foreign material other than natural gum:

Water, 600 gals.; Green olive oil soap, 30 pounds; Sal soda, 5 pounds; Ammonia, 1 gallon.

Remove and wash twice in soft water at 28° C. Then neutralize soap and make silk more receptive to the tin salt by washing in:

600 gallons water, 3 gallons muriatic acid.

Dry in extractor. Impregnate by immersing in tin tetrachloride (28° Be) for 1 hour, remove, extract and wash with cold water, and again extract. Place in a 600-gallon bath of sodium phosphate (4-5° Be) for 1 hour, wash twice in soft water and again in a 603-gallon bath of dilute muriatic acid (600 gallons water, 3 gallons muriatic acid). Wash and extract. Above may be repeated 1 to 5 times according to weight required. Wash with water, extract and subject to a sodium phosphate bath for 1 hour. Wash 3 times in a bath of 600 gallons water and 10 pounds sal soda. Treatment followed by subjecting to 600 gallons water and sodium silicate (4-5° Be) for 1 hour. Wash in three changes of soft water and then a bath for ½ hour of:

Water, 600 gallons; Sal soda, 40 pounds; Ammonia, 3 gallons.

Follow with a bath for 1½ hours of:

Water, 600 gallons; Green olive oil soap, 50 pounds; Ammonia, 1 gallon.

Wash with water and muriatic acid, extract and dry. Just prior to throwing, treat with a solution of the following per 100 pounds of silk:

Water, 100 gallons; Glycerine, 5%; Neatsfoot oil and soap, 4%.

Throw, weave and dye.

Claims that the dyeing operation may be delayed by storage until needed; glycerine facilitates throwing, making for a more beautiful woven product; weighting before these operations important since it avoids fibre disarrangement and makes greater percentage of tin incorporation possible.

**1,457,607**

Weighting and Dyeing Silks.

Carl von der Schmalz. June 5, 1923.

Process consists in treating raw silk in the following steps, based on 100 pounds of raw silk:

1. Boil off in a 15% olive soap solution in water;
2. Dye at 212° F. for 1 hour, then add Glauber salt equivalent to 25% of weight of silk treated and hold for 1 hour at 212° F.
3. After washing in cold water to which 1 pound of chrome potash is added, fasten the color with a 3% formaldehyde solution at 130° F. for ½ hour. Wash in cold water.
4. Last step consists in combing with boiling water at the proportion of 125 pounds sumac to 200 gallons water, in which solution the silk is allowed to stand for 1½ hours. Wash in cold water.
5. Soak silk in a 10% olive soap solution with water at 120° F. for 30 minutes. Wash in water at 100° F., followed by 15% by weight of acetic acid and ½ pint olive oil dissolved in 1 ounce sodium carbonate.

In lieu of sumac, gall nuts may be used.

Claims fast color to washing and sunlight; non-injurious to silk; non-poisonous; greater fiber strength.

***(Continued on page 198)***

PROCEEDINGS OF THE
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APRIL 5, 1937

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P. J. Kennedy, Secretary, E. I. duPont de Nemours & Co., Inc. 61 Thomas St., New York, N. Y.

**Philadelphia Section**
Herbert S. Travis, Chairman, Rohm & Haas Co., Inc., 222 West Washington Square, Philadelphia, Pa.
R. W. Delaney, Secretary, National Aniline & Chemical Co., 200 S. Front St., Philadelphia, Pa.

**Piedmont Section**
Thomas R. Smith, Wiscasset Mills Co., Albemarle, N. C.
A. Henry Gaede, Laurel Soap Mfg. Co., Charlotte, N. C.

**South Central Section**
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Murray B. Smith, Secretary, 2404 Union Ave., Chattanooga, Tenn.

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Herbert W. Tetzlaff, Secretary, Geigy Co., Inc., Milwaukee, Wis.

**South-Eastern Section**
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Alfred R. Macormac, Secretary, Alabama Polytechnic Institute, Auburn, Ala.

**Lowell Textile Institute Student Section**
Lee Gale Johnson, Chairman; Hugh Francis Carroll, Secretary.

**North Carolina State College Student Section**
A. E. Shumate, Chairman; J. W. Furr, Secretary

**Philadelphia Textile School Student Section**
John L. Waldo, Chairman; Wayne F. Fry, Secretary

Members should notify the **Secretary** immediately of all address changes

## ANALYTICAL METHODS

The Council has authorized the republication of the "Analytical Methods for a Textile Laboratory" in the 1937 Year Book. The committee in charge of this section will be glad to correct any errors or omissions in these methods as published in the 1935-36 Year Book. The members of the A. A. T. C. C. are therefore requested to review these methods and send to the chairman of this committee not later than March 15, 1937, any suggestions for the improvement of the existing methods or any new methods which seem suitable to include in this section.

Walter M. Scott, Chairman,
857 Boylston Street,
Boston, Massachusetts.

## REPRINTS

### Analytical Methods

Reprints of the Analytical Methods as printed in the 1935-6 Year Book are now available from the secretary of the Association for $.75 per copy postpaid.

## CALENDAR OF COMING EVENTS

**Meeting, New York Section, April 23, 1937, Swiss Chalet, Rochelle Park, N. J.**

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**Meeting, Philadelphia Section, duPont Hotel, Wilmington, Delaware, April 9, 1937.**

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**Spring Meeting, Piedmont Section, King Cotton Hotel, Greensboro, No. Carolina, April 17, 1937. The Council will also meet there on the morning of the same day.**

* * *

**Meeting, Northern New England Section, Andover, Mass., May 7, 1937.**

* * *

**Annual Meeting and Convention, December 3 and 4, Bellevue-Stratford Hotel, Philadelphia, Pa.**

# "Fiberglas"* Products†

J. L. TUCKER**

EVERY product that is a success or that is going to be a commercial success has certain characteristics that allow it to either compete with products in use or has certain characteristics that make it far superior to anything on the market. In many instances, we buy and use many items or products because they appeal to the eye or imagination, forgetting those characteristics of the product that make it superior for the application for which it is to be used.

Many individuals in reading or hearing of Fiberglas products immediately picture to themselves that these products are similar to Spun Glass, used for decorative purposes, such as Christmas tree decorations or glass novelties. (Spun Glass novelties are made in large quantities in most European countries). Spun Glass fiber is not comparable with Fiberglas in that Spun Glass fibers are made by hand methods that have changed very little in the past one hundred to two hundred years. The methods or processes consist, first, of making glass rods. These are then bought by the individuals who heat them to the melting or softening point, at which time they are drawn into coarse fibers by means of revolving drums or wheels. These fibers have a length that depends on the circumference of the drums or wheels used. Spun Glass fibers are especially coarse, very brittle, are not flexible, and cannot be twisted into yarns or threads. Although woven novelties are made from these fibers, such as ties, small mats, etc., these items are made by hand by laying the fibers all in parallel which is a slow and tedious process. This short resume on Spun Glass has been given in order to show how impractical it would be to produce any quantity which will allow its use in any large amount at a reasonable price.

There are many types of Fiberglas fibers. They vary in diameter according to their use, and this also is true in regard to their length. Characteristics other than these are varied according to the type of glass used. The type of Fiberglas fibers for textiles are made into two distinct types of strands; one type is known as staple fiber and the other as continuous fiber. The staple fibers average eight inches to fifteen inches in length, whereas the continuous fibers have a length depending on the yardage on each package. The number of fibers that are combined into each type of strand depends on the size or weight of the yarn desired.

Let us now summarize those characteristics of Fiberglas that make it an entirely new development, at the same time allows entrance to the field with other textile products, fulfilling the requirements of individuals and industrial organizations, a product in many instances that does not compete with standard textile products but which can be used where other products would not be most practicable. Those characteristics that make Fiberglas practical are as follows:

1. *Diameter*: The diameter of the individual filaments, used for the products that will be twisted or woven, can be made in various sizes varying from .00005 to .0003. The fiber diameter used for most of the products at this time average between .00015 to .0002. The finer diameter fibers are more flexible; as the diameter is decreased, more filaments are used in the finished strands and strength per square inch increased.

2. *Length*: The staple type of Fiberglas fibers averages eight inches to fifteen inches in length, which allows the sliver to be drafted into finer yarns. The continuous type of Fiberglas fibers have a length depending on requirements by the customer. The fibers can be just as long as the yardage on the individual packages.

3. *Strength*: The strength of the single fiber when calibrated or figured to a square inch basis shows strength in many instances over 2,000,000 pounds, or in other words, many times stronger than the fibers generally used for yarns or fabrics.

The strength can be increased or decreased by changing the glass formula.

4. *Acid proof*: The fibers are acid proof, with the exception of Hydrofloric, and can withstand the actions of acid.

5. *Heat or fire-resisting characteristics*: Fiberglas fibers are produced that withstand temperature up to 1500 and 1600° F. At this temperature, the Fiberglas merely starts to soften or melt.

By combining fibers into strands and strands into fabrics, the resistance against heat or fire would increase.

* Name Fiberglas is copyrighted.

†Presented at meeting, Philadelphia Section, Jan. 15, 1937.

**Owens-Illinois Glass Co., of Newark, Ohio.

6. *The Fiberglas fibers or products will not mildew or rot*: In that no vegetable matter or other ingredients are used in the making of the fibers that will deteriorate or degenerate with age, or because of general condition, it will be impossible to rot or mildew the fiber.

7. *Germ proof*: The fibers, because of their composition, can be cleaned with acids, soap and water, and cleaning solutions, and are, therefore, germ proof.

8. *Permanent colors—most permanent*: a. Color in the original batch mix.

b. The color is all through the glass and is not a surface color, such as a film or surface coating like a dye, varnish, lacquer, etc.

c. Color is not affected by heat.

d. Color is not affected by light.

e. Color is not affected by weathering.

f. Does not run.

9. *Insulation against cold or heat*: Fiberglas fibers and products are efficient insulation against cold and heat and are used in large quantities for many industrial applications.

10. *Good Dielectric chracteristics or Electric Strength*: The characteristics of the glass can be changed to vary the Dielectric strength as desired.

11. *Electric Resistance or Resistivity*: It is exceptionally good; better than asbestos or cotton.

12. *Effect of high temperatures on strength of Fiberglas*: When tested against standard types of tapes and woven insulation, it stands up under high temperatures. Such temperatures as 300 and 600° F. do not affect it. Varnishes and lacquers have been burnt off Fiberglas tapes, without affecting the tape to any extent.

13. *Processing of Fiberglas into yarns, braids, fabrics, etc.*: With practically no changes in standard textile machinery, the Fiberglas can be processed on Roving, Spinning, Twisting, Winding and Braiding Machines; also on looms, and Knitting and Sewing Machines.

14. *Non-Ferrous*: The Fiberglas fibers or glass formulas are free of any iron and, therefore, can be used or applied where no other product has been practical and efficient.

15. No other textile fibers are mixed with Fiberglas in order to produce the finer yarns and fabrics. Where asbestos is to be spun into fine yarns, in most cases where it is to be woven, 5 per cent to 20 per cent cotton is mixed with the asbestos, or in other words, Vegetable Fibers are mixed with Mineral Fibers.

Fiberglas needs no other fiber added, even in producing .005" thick tapes or fabrics; the yarns used are 100 per cent glass.

The standard textile processes that can be used, with very little changing, include such machines or processes as spinning, where it can be drafted; twisting, where the strands can be plied; slashing or dressing, where the strands can be prepared for weaving; weaving, where the strands are woven into fabrics or tapes; finishing, where the woven fabrics are washed and prepared for marketing, etc.

In order to appreciate the development of Fiberglas products one has to visualize the possibilities of producing glass fibers from a large piece of glass, a glass container, such as a bottle or a pile of sand. There are thousands of different glass formulas, therefore, the characteristics of Fiberglas can be changed accordingly. These fibers, as previously stated, are produced in two types or forms for textiles. The type known as staple is formed into a sliver or ribbon which can be made into any size or weight desired by the user. This sliver or ribbon can be used as is (as it has considerable strength; in fact, can be rewound at high speeds as a sliver), or it can be twisted into coarse or medium size yarns or roving. Providing finer yarns are desired, the sliver is merely fed to a spinning frame and drafted to the size of yarn desired. Providing cords, threads or ply yarns are wanted, any standard type twister can be used, such as cotton, worsted or silk doubling or twisting machines. Providing the yarns are to be woven into fabrics for industrial purposes, they can be processed similar to standard textile yarns, using such machines as winders, warpers and slashers or dressers and other machines that are normally used previous to weaving. The finishing of the cloth is handled practically in the same manner as are other textile fabrics. We have not as yet completed our experiments on the dyeing or coloring of Fiberglas yarns or fabrics as permanent colors can be produced by making the original glass in the colors requested.

The second type of fibers, known as the continuous type, are made by combining as many filaments as are desired in the finished strand. In this particular instance, where the fibers are first combined, no twist is used. This strand is wound on a universal type of package, and the strand or filaments are continuous on each package. These strands are then combined into the size of yarn, cord, and thread requested by the customer. Standard types of twisters can be used. Also, all other processes used for preparing it for weaving can be similar to those used in average textile mill.

The Fiberglas products that have been produced and accepted for applications, wherein the characteristics of the product are more practical for use than other products, are as follows:

1. *Tapes for insulation purposes, such as electrical applications*: The tapes are woven in thicknesses from .005" to .025" or thicker, if necessary. The tapes can have a high sheen or can have a soft appearing luster. They can be made with considerable flexibility or very little flexibility.

2. *Cloth or fabrics for insulation purposes, such as electrical insulation*: Where fabrics, similar to varnished cam-

brics, are needed to cover cables, Fiberglas fabrics are most practical and efficient.

3. *Belts for applications where it is necessary to resist high temperatures, gas fumes or acids*: Belts are woven up from both our coarse and fine yarns and are not affected by heat, acids or gases. These belts are pliable.

4. *Filters for pigments, acid or chemicals, gases, etc.*: Normally, cotton fabrics, asbestos fabrics, or wire-woven products are used for filtration purposes, but these items do not stand up in many instances and have to be replaced often, in some instances, within a few hours. Fiberglas fabrics are being used and tested for filtration purposes and appear to be practical and efficient at a resonable cost.

5. *Draperies—fire-proof type; also for decorations*: In that the Fiberglas fibers can be spun and woven into fabric, in that they are fireproof, in that color effects can be produced and colors are permanent, they can be used in producing draperies or curtains that not only appeal to the eye but are most practical.

6. *Screens, such applications as movie screens, fire screens, etc.*: Tests are being made on the use of Fiberglas fabrics as screens, in that it has a sheen or luster all its own; also can be woven into fabrics of different weaves, and this should make it practical as a screen.

7. *Awnings—fire-proof*: In that awnings in many cities are not allowed above a certain floor unless fire-proofed in some manner, Fiberglas, therefore, can be made into not only fire-proof awnings, but with color effects that will appeal to the eye.

8. *Decorations (interior, etc.)*: Used for wall decorations, costumes, pictures, table pads, trays, etc.

9. *Fabrics for insulation (firemen's clothing, etc.)*: In that the Fiberglas can be produced or fabricated into woven fabrics, and in that Fiberglas yarns or threads are being used in sewing machines, fire-proof clothing is another practical product.

10. *Slivers for insulation or covering for wires, cables*: Fiberglas slivers are being used for covering wire, and its thickness is approximately .003" to .004".

11. *Yarns and rovings for insulation*: Fiberglas yarns and rovings are being used for wire and cable insulation.

12. *Braids or Sleeving*: Fiberglas yarns braided into sleeving or onto a wire or cable. Special braid lines have been made from Fiberglas (fishlines, etc.).

13. *Packings*: Fiberglas products include packings made with either slivers, yarns, braid, etc.

In the foregoing paragraphs, we have discussed mostly Fiberglas textile products. There are many other products other than textiles that are made from Fiberglas, most of which are well known and have been accepted for some time as the most practical and efficient products for the particular applications, wherein their characteristics, including the lightness in weight, make them superior to other products for the same use. These other Fiberglas products are:

1. *Air filters*: Used in air conditioning units in homes, industrial buildings, and public buildings. Used in cleaning air for salt and flour drying mills.

Used in cleaning air in engine rooms, pumping stations. During the dust storms, these filters saved many pumps and considerable pumping equipment from damage because of the dust.

Used in foundries, chemical plants, etc.

2. *House insulation*: Used between floors, walls and near the roof. Fuel saving in most instances and pays for the installation in three to four years. It insulates against cold and heat to about ten degrees (10°) difference because of this insulation.

3. *Hot water heater insulation*: Cuts down cost of heating, eliminates considerable of the heat loss due to radiation.

4. *Refrigerator insulation*: Used in ice boxes, electric refrigerators, refrigerator cars, airplanes, balloons, etc.

5. *Acoustical products*: Made into sheets, boards or molded into panels.

6. *Felted materials for special purposes*: Dehydrating air, dehydrating carbonated gases.

7. *Blankets for insulation purposes*: Used for boiler insulation, tanks, vats, etc.

8. *Battleship insulation*: Insulation against cold, heat and vibration.

9. *Pipe insulation*: Steam, water, general piping, etc.

10. *Special cements*: For high temperatures, for boilers, pipes, etc.

All the Fiberglas products mentioned in this discussion have been developed within the last two to five years, the textile Fiberglas has been developed within the last two years, and as a final remark, it is interesting to note that knots can be tied in glass.

## DISCUSSION

*Q.* Did you have to color the fibers in a mass or in mass formation? What type of color do you use?

*A.* At the present time the color is put in the glass while the batch itself is being made, the color being one of the ingredients. Investigation is being made into the use of dyes and chemicals as a means of coloring the individual fibers or yarns. At the present time there are approximately one dozen different colors which may be put into the product at such a time as appears practical.

*Q.* As to filtering materials, you refer to a use as an air filter. How does it compare to other air filters?

*A.* The Company has manufactured for several years an air filter of the replacement type; essentially, it consists of adhesive coated glass fibers contained between metal grills in a fiber frame made up in standard units measuring 20" square and 2" thick with a capacity per unit of 800 C.F.M. These single cells, built up into multiple type units in many cases have a capacity of 50,000 C.F.M. The

filter is of the replacement type, which means that when it becomes clogged with dirt it is thrown away, and is distinct from the cleanable type filter. Glass fibers lend themselves to this use because the diameter can be controlled and an air filter having progressively smaller openings is possible.

The filter is fire resistant, another quality made possible by using glass fibers. The efficiency and economy as compared to other filters, are exceptionally good. The filters are used extensively in large air conditioning jobs as well as warm air furnaces and room cooling units.

*Q.* To whom can a person write for answers to the question of resistance or replacement type air filters?

*A.* The Owens-Illinois Glass Company, Industrial & Structural Products Division, Philadelphia, Pa., attention of Mr. W. A. Soderberg.

*Q.* Are there practical installations?

*A.* Approximately 50% of the air cleaning installations and ventilating work is done with these Owens-Illinois Glass Company "Dustop" air filters. The installations range all the way from small homes to large industrial concerns and public buildings. Literature on the filters can be obtained from the above mentioned representative.

*Q.* In checking up a cone of Fiberglas I noticed it was higher in weight than a yarn would be of the same size. Is this correct?

*A.* Yes, approximately two to two and a half times as heavy for a yarn of the same diameter made with other standard textile fibers. To overcome this characteristic we make our yarns approximately 1-3 to ½ the diameter of other standard yarns.

*Q.* About what capacity are you turning out a day?

*A.* At the present time we have approximately four machines making the raw stock and we are adding additional machines as required.

*Q.* Question of air to be humidified. Do I understand that you can draw a foggy atmosphere into your filter?

*A.* It is not recommended that air containing a large amount of water droplets be drawn through the filter. The adhesive on the glass fibers is quite efficient in wetting most dust. It is insoluble in water, but a large amount of water running down over the face of the filter would tend to flood off the dust catching adhesive.

For removing fog or spray from the air, we recommend what is called an eliminator mat. More information on this product can be obtained from the above mentioned source.

*Q.* Is fiber smooth?

*A.* The fiber is smooth and in that we make two types, Staple and Continuous, we can control the length and also certain other characteristics desired, also the diameter and surface formation.

*Q.* What percentage of elasticity does it have?

*A.* The fiber has practically no elasticity but when fabricated or processed into yarn, there is a certain amount of elasticity due to fabrication.

*Q.* How does the durability or the strength of the braided rope as made from Fiberglas compare with other textile rope made from standard textile fibers?

*A.* Fiberglas resists the action of weather, acids and heat more than do the other textile fabricated fibers.

*Q.* In making into a fabric, is it a characteristic of the fiber that you sometimes feel in the absence of underclothing?

*A.* This is a characteristic of the present type of Fiberglas but the types being produced by our Laboratory will eliminate this characteristic. Our present Fiberglas is not being produced for dress fabrics, as that produced for this application will have other characteristics.

*Q.* For the application of film formation has synthetic resin been found satisfactory for fibers of this type?

*A.* We are working with several of the synthetic resin manufacturers throughout the country in order to find the most practical coating for certain applications on Fiberglas fibers, yarns, cloth, braid and tape. We are interested in any type of resin that can be applied satisfactorily and that will have flexible characteristics.

*Q.* What is the resistance to abrasion of your fabric?

*A.* Our present type of cloth resists abrasion more than that fabricated a few months ago, and we hope to make this characteristic compare favorably in the near future with that of other fabrics. In fact, we hope to make this characteristic of Fiberglas far superior to other standard textile products.

*Q.* What about application of these fibers on clothing fabrics?

*A.* Our present program does not call for the application of these fibers on any woven fabrics other than those that can be used for industrial purposes and for decorative effects.

*Q.* Could they be used for clothing?

*A.* In many instances yes, but our present product is not for clothing such as dress wear.

*Q.* If a fabric is subjected to additional gouging and mechanical abrasion does this particular fiber require particular skill?

*A.* Our drafted yarns also our finer diameter filament yarns resist the gouging and mechanical abrasion more so than do our coarser fibers, therefore, the application would have much to do with the type of yarn and fabric to be fabricated for the particular use to which it is to be put.

*Q.* One characteristic of fibers which varies is when we need any plugging up of lattice work of filter medium. How would it act with glass?

*A.* In order to know more about this application and in order to obtain more information regarding this, it would to best to write to our Newark laboratory known as the Industrial & Structural Products Division, Newark, Ohio, to the attention of Mr. D. C. Simpson.

# Sizing of Rayon Crepe Yarns

## and The Effect of Alkyl Radicles on the Softening Potency of Oils*

H. H. MOSHER†

THIS evening I shall confine my talk to a consideration of the composition of the size sheathes employed in preparing rayon yarns for crepes and the influence of certain alkyl radicles on the softening potency of oils and hydrocarbons.

Crepes result from the release of that potential distortional energy, produced in yarns and fibers during twisting and set therein during tension and steaming, during the boil-off or scouring operation. The liberation of this energy causes the crepe yarns, generally woven into cloth form, to releave itself of strains and distortions, and as a result the fibers tend to buckle and kink and imparts to the material composed of it, that peculiar surface roughness known as crepe.

The manner in which the released energy exhibits itself upon the yarn is extremely complex and depends upon a variety of imperfectly investigated factors such as the size, type and twist of the threads, the construction of the cloth, the extension and stretch of the yarn during throwing and weaving, the rapidity at which the energy is liberated during scouring and the diametrical expansion and linear contraction of the fiber during that period in which the energy is being released.

The sizing material which envelops the rayon crepe yarns exercise a determining influence upon many of the factors given above and even comparatively minor variations in the composition of the integument exercise a major effect on the appearance of the crepe and determine whether a coarse, medium or fine pebble will be produced upon the surface of material prepared from such yarn. Fibers are subjected to considerable tension during throwing and weaving. This factor is of but little importance with silk and cotton as either will withstand any normal tension to which they might be exposed without extending them beyond their elastic limits.

The synthetic fibers, however, though they possess the capacity to elongate considerable before breaking, nevertheless have a relatively low true elasticity and are likely to be permanently elongated unless reinforced by a size of sufficient film strength to support the fibers against excessive tension.

This, of necessity, requires sizing ingredients which yield film of great tenacity.

The sizing ingredients which can form integuments of the requisite strength and which can also be readily eliminated during the conventional scouring procedures, are very limited. The film strengths of the gums, starches and dextrins are low and most resins, either natural or synthetic, are unsatisfactory because of insufficient reenforcing strength, lack of adhesiveness to the synthetic fibers or to difficulties in removal during scouring.

Only the protein sizes and a very few oxidizable oils possess the required film strength and necessary ease of removal during "boil-off."

The oxidizable oils have been but little used in this country as a crepe size though they have been extensively employed in Europe. The oil most generally used is boiled linseed containing various catalysts to regulate oxidation. It is the film produced on the yarn by oxidation which forms the reenforcing size. The formation of this film is always accompanied by the development of heat, and this heat almost invariably produces an adverse influence upon the strength and elasticity of the rayon.

The removal of the oxidized oil from the rayon during scouring is difficult and requires a special boil-off procedure to effect its complete elimination. It is also difficult to regulate or control the type of pebble produced during scouring and dyeing.

Consequently we have confined our sizing experiments most generally to the protein materials. There are a number of protein and albuminous substances which would be suitable for crepe film if the cost factor could be disregarded. This, however, is of paramount importance with the result that the throwster is practically limited to the gelatins, glues, caseins and soya bean proteins.

Gelatin forms films of the greatest tenacity and this ingredient is almost universally employed.

Gelatins vary considerably in film strength and differ considerably in "flow", "spread", their adhesiveness to

*Presented at meeting, New York Section, Jan. 29, 1937.
†Director of Research, Onyx Oil & Chem. Co., Inc.

rayon and ease of plasticization. As these latter factors are important the protein is generally modified by the addition of auxiliaries to produce a more nearly optimal flow and spread.

The strength of gelatin film is effected by the pH of the size, the more nearly the hydrogen ion concentration of the solution approximates the iso-electric point, the more tenacious the films derived from the solution. The iso-electric point of gelatin varies between pH 4.0 and 5.0 depending upon the origin of the protein. In some cases that value may be a little too acid for synthetic fibers, so it is general practice to adjust the size solution to a pH of about 5.0 or 5.2.

Rayon yarns containing a gelatin sheathe are ordinarily too stiff and brittle for efficient throwing and weaving and consequently are invariably plasticized and lubricated by a heavy-bodied, stable, soluble oil, which in itself possesses some reenforcing strength. The oil converts the gelatin film to about the plasticity of rubber.

The amount of size (i. e. gelatin) required to furnish a film of the necessary strength is about one-half percent the weight of the yarn. This corresponds to four pounds per sizing bath (enough for 100 lbs. rayons). However, for purposes of economy three pounds is more generally used in commerical practice. The plasticizing oil is always used in the sizing bath with the gelatin. The ratio of oil to gelatin exert a determining influence on the type of pebble to be derived from crepe yarns soaked in this solution.

I previously stated that the type of rayon crepe which a fabric would produce depends among other factors upon the rapidity at which the stored energy is released during scouring, the degree of extension applied to the yarn during throwing and weaving, the diametrical expansion and linear contraction of the filaments during the release of the distortional forces and I might add the lubricity of the crepe yarn against the warp.

The rayon size sheathe influences each and every one of these factors and, in consequence, often exerts a determining influence as to whether a crepe will have a fine, medium or coarse pebble.

A crepe, the altitude of the effect being what might be termed average, is produced by employing about five parts of oil for every part of size. Thus if the throwster uses four pounds of gelatin in his soaking bath, that should be accompanied with twenty pounds of a suitable oil. Such a formula is entirely satisfactory for the usual types of rayon crepe. By varying the amount of oil the pebble effect can be either accentuated or subdued. To accentuate the degree of pebble the oil is ordinarily either increased or the gelatin reduced to three pounds, and conversely by decreasing the oil the size remaining a constant, the fineness of the pebble can be subdued.

The illustration of this principle is shown by the following:

Three pieces of rayon (viscose) crepe were prepared on the same warp; the crepe threads were thrown and woven on the same machines, stitched together as one piece and scoured, dyed and finished together. The only difference in the three pieces was that the crepe threads were differently sized. The yarns were soaked in accordance with the formulae below:

Piece A soaked

| | |
|---|---|
| Gelatin | 4 # |
| "Sulfonate Coconut" | 25 # |
| Time | 40 mins. |
| Temp. | 120° F. |

Piece B soaked

| | |
|---|---|
| Gelatin | 4 # |
| "Sulfonate Coconut" | 20 # |
| Time | 40 mins. |
| Temp. | 120° F. |

Piece C soaked

| | |
|---|---|
| Gelatin | 4 # |
| "Sulfonate Coconut" | 15 # |
| Time | 40 mins. |
| Temp. | 120° F. |

Of course the pebble on the three pieces might have been levelled to some extent by embossing, a more protracted boil-off and by other mechanical means, but a complete uniformity of pebble is possible only when the crepe yarn is evenly sized.

It is customary among certain rayon throwsters to maintain a standing sizing bath. The success of this method of sizing rayon yarn depends largely upon the constant control of the ingredients comprising it and the employment of both a size and oil which uniformly exhausts. Many of the dyers' problems and difficulties arise from the fact that certain throwsters employ standing baths in which either the protein or the oil is preferentially absorbed or repelled by the rayon, thus altering the composition of the bath for the next lot of yarn.

The finishing of rayon crepes is comparatively simple from a chemical standpoint. Ordinarily only a certain amount of softener and for certain purposes a duller and spot-proofer are applied, usually on a quetsch.

I will confine my discussion solely to a consideration of softening agents and the influence of certain organic radicles on the finishing properties of oils.

Almost all known true softening agents save water, contain hydrogen, carbon and oxygen and belong to that division of science known as Organic Chemistry. Organic Chemistry may be further subdivided into straight chain compounds called aliphatic or ring compounds, most of which are called aromatic.

The ring or aromatic derivatives are devoid of softening properties for textile purposes. That should not, however, be construed as implying that they are without merit when used with or condensed with long chained aliphatic groups.

Most softening agents are true colloids or form with emulsifying agents colloidal emulsions. The particle size of the softening agent and the ability of that colloid to penetrate into textiles influences the potency of the reagent. Many aromatic compounds possess valuable emulsifying properties and induce otherwise inferior softeners to assume a proper particle size and are also of interest in inducing more effective penetration.

The summary of results on the effect of certain aliphatic radicles combined to hydrocarbons and oils to be described were based on a uniformity of colloid particle size and, insofar as was found possible, a uniformity of penetration into the fabrics and yarns tested.

Almost all softeners belong to that division of Organic Chemistry known as the aliphatic compounds. Fortunately, most aliphatic compounds arrange themselves into groups or families, starting with some simple member and becoming more complex by the simple addition of some type radicle.

The simplest of the aliphatic compounds are those containing only carbon and hydrogen and the most elementary member contains one atom of Carbon combined with four atoms of Hydrogen and bears the chemical formula $CH_4$

$$\text{or structural formula } \begin{matrix} & H & \\ H & - & C & - & H \\ & H & \end{matrix} .$$

This may be called the structural unit of the aliphatic series. All higher members of the paraffin series, for the compounds containing only saturated carbon and hydrogen atoms are called such, may be assumed to have been built up from a simpler form by subtracting one hydrogen atom from the lower member and adding a $CH_2$ radicle.

Thus, starting with methane the next higher member bears the formula $C_2H_6$ and a whole series of still more complex compounds are known.

Another property of the aliphatic family groups is that a certain property becomes accentuated or restricted as we pass from the simpler to the more intricate chemical members.

The lower members of the paraffins are gases but as we pass up the family to more or more complex structures the paraffins become first limpid liquids, finally oily and eventually dry, waxy solids.

None of the simpler structures possess any value as softening agents but when we reach the hydrocarbon containing twelve carbon atoms (dodecane) we find a substance which is oily in character and has some ability to soften textile fabrics though the action is more one of surface lubrication than a true softening action.

With increasing complexity the properties of dodecane are accentuated until hexadecane is reached. This hydrocarbon is possessed with the maximum softening action of any simple saturated hydrocarbon. It possesses the property of imparting to rayon fibers a maximum of surface lubricity but is not a good softener.

Hexadecane has the structural formula

```
H H H H H H H H H H H H H H H H
H-C-C-C-C-C-C-C-C-C-C-C-C-C-C-C-H
H H H H H H H H H H H H H H H H
```

All the paraffins are long chained compounds in which the carbon atoms are linked together by a single bond of valence. Thus ethane has the structural formula

```
H H
H-C-C-H.
H H
```

It is possible however to link two carbon atoms together by two bonds of valence or even with three. Thus from ethane we can by suitable means secure ethylene in which the carbon atoms are united with two valence bonds or acetylene with three.

```
H  H
C=C                H-C=C-H
H  H
Ethylene           Acetylene
```

Similar complexes are obtained with the more intricate paraffin structures. The incorporation of such a double bond into the product hexadecane increases the softening potency of the resultant derivative. That apparently is a general law of chemistry as it applies not only to the hydrocarbons but alcohols, aldehydes, acids as well as their ethers, esters, and amines.

With long chain derivatives it is theoretically possible to form compounds bearing within the molecule poly unsaturated valences. However, most such derivatives are rather unstable and at present do not appear to be of commercial importance.

It is also possible to further augment the softening power of a simple hydrocarbon by the substitution of hydroxyl (OH) radicles for hydrogen atoms along the chain. A single such substitution produces a marked influence but further hydroxyl additions appear to impair rather than accentuate the effect.

Hydrocarbons are capable of reacting with a variety of groups and radicles and forming complexes of great intricacy. A study of the manifold derivatives possible are infinite but the writer will treat with some of the simpler structures and record the influence of structure on the softening and finishing effect.

Hydrocarbons might be assumed capable of oxidation and as such pass through at least three steps. From methane for an example, we might assume that oxidation will carry it through an alcohol to an aldehyde and finally to an acid.

| $CH_4 \rightarrow$ | $CH_3OH \rightarrow$ | $CH_2O \rightarrow$ | CHOOH |
|---|---|---|---|
| methane | methyl alcohol | formaldehyde | formic acid |

It must be understood, however, that alcohols, aldehydes and organic acids are not ordinarily formed in that manner.

The alcohols, aldehydes and acids differ from the hydrocarbon only in the terminal endings.

With hexadecane similar alcohols, aldehydes and acids are obtainable

$R\text{-}CH_3 \rightarrow R\text{-}CH_2OH \rightarrow R\text{-}CHO \rightarrow R\text{-}COOH$

hexadecane — cetyl alcohol — cetyl aldehyde — palmitic acid

with R representing all the molecule save the final terminal carbon atom and its attachments.

Logically the softening properties of the alcohol should be given first consideration but due to the greater abundance of the fatty acids and their esters, these will be given first consideration.

The fatty acid corresponding to hexadecane is called Palmitic. Like the hydrocarbon it possesses sixteen carbon atoms and differs from the simpler paraffin only in the chemical configuration of its terminal carbon radicle. The final radicle of hexadecane is $-C-H$ (H) whereas the palmitic acid has a carboxyl terminal group $-C(=O)-O-H$. This carboxyl group imparts to the acid a greatly enhanced softening potency. The acid penetrates into fabrics far more effectively and produces greater loftiness, silkiness and softness when applied to either animal or vegetable fabrics.

Just as the softening properties of hexadecane can be improved by introducing a double bond into the chain and by substituting a hydroxyl radicle for a hydrogen atom on any carbon atom along the chain, so plamitic acid can be rendered a more effective softener by similar modifications. Such modifications, however, tend to decrease the stability of the resultant compounds and renders them susceptible to oxidation and polmerization during prolonged ageing often with the accompaniment of an objectionable rancid odor.

Organic fatty acids in contradistinction from the simple paraffins are chemically active substances and react with alcohols forming esters, with amines forming amides and with metallic ions forming soaps.

As a class the introduction of ester, amide and soap structures to the fatty acids inhibit rather than improve the softening properties of the acid and usually the more intricate and complex the derivative the more adverse its softening action. However, there are some exceptions, particularly with complex ester, amide and amine structures.

One of the most important of commercial softening agents are the sulfuric acid esters of fatty acids in their esters. These are the so-called sulfonated oils of commerce.

They are formed by the interaction of sulfuric acid upon various fatty acids and saponifiable oils. It is essential that the basic material contain either unsaturated bonds or hydroxyl radicles in its molecule. Palmitic acid, however, is a saturated aliphatic acid and does not form sulfuric acid esters. It can, however, react with sulfuric acid at elevated temperature to form true sulfonates. Sulfonates, although they possess the property of emulsifying certain raw oils and waxes, are not good softening agents for textiles. In fact they are inferior to hexadecane itself.

If we take an unsaturated fatty acid such as oleic, we find that this compound possesses double bonds in its molecular structure. It in consequence reacts readily with sulfuric acid forming ester. Below appears the formula of oleic acid

$$CH_3(CH_2)_7\overset{9}{C}H=\overset{10}{C}H(CH_2)_7COOH$$

An inspection of the molecule shows that a double bond occurs between the 9th and 10th carbon atoms of the chain. Sulfuric acid can enter into combination with either of these carbon atoms forming two different types of sulfuric acid "sulfonated oils" namely:—

$$CH_3(CH_2)_7CH(O\text{-}SO_3H)(CH_2)_8COOH \quad \text{or}$$

$$CH_3(CH_2)_8CH(O\text{-}SO_3H)(CH_2)_7COOH$$

Either of the above compounds possess softening properties but that compound with the sulfate group attached to the ninth carbon atom furnishes the more potent action. Neither of the sulfuric acid esters alone equals the unsulfonated acid in effectiveness. However, various blends of "sulfonated" and raw oils surpasses either in softening action.

A fatty acid often contains in addition to unsaturated bonds hydroxyl radicles. Such acid, either of natural or synthetic origin can form not two but at least three sulfate esters. It is possible to prepare from oleic acid, a compound possessing the formula

$$CH_3(CH_2)_7\overset{9}{C}H=\overset{10}{C}H(CH_2)_2CHOH(CH_2)_4COOH$$

An inspection of that compound shows that from this acid three different types of sulfate esters might be expected, namely;

$$CH_3(CH_2)_7CH(O\text{-}SO_3H)(CH_2)_3CHOH(CH_2)_4COOH$$

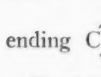
$$CH_3(CH_2)_8CH(O\text{-}SO_3H)(CH_2)_2CHOH(CH_2)_4COOH$$

$$CH_3(CH_2)_7CH=CH(CH_2)_2CH(O\text{-}SO_3H)(CH_2)_4COOH$$

All have been prepared, and inspected for softening efficiency. It was found that the presence of a hydroxyl radicle in a sulfated oil increased the effectiveness of the oil for softening purpose but decreased its stability. In consequence the potency of the oils above decreased in potency as we go down the column.

The above discussion on sulfate esters refers to pure materials and is not to be confounded with commercial practice. The industrial manufacture of these oils depends on art more than on exact science. The position in the molecule in which the sulfuric acid enters is more or less fortuitous and the commercial preparations are further complexed by the presence of oxy and hydroxy

acids, lactones, polymers and other decomposition products. All of such products exert their influence upon the character of the oil.

If an acid such as palmitic is reduced it forms first an aldehyde, palmitic aldehyde. Neither the free or sulphated aldeyhde was found an efficient softening agent. This was rather surprising since its similarity in constitution to the fatty acids and alcohols led to the assumption that a very effective agent would result. The terminal ending  apparently inhibits softening properties.

Further reduction of palmitic acid yields cetyl alcohol. This alcohol, when applied to textiles under suitable conditions, surpasses the fatty acids in value. Like the acids the softening properties can be enhanced by "unsaturating" the molecule and introducing either unsaturated valences or hydroxyl groups and can be inhibited by introducing either sulfate or sulfonated groups. A combination of unsulfonated and sulfonated molecules yielded optimal softening conditions.

The chemistry of the subject of textile softening agents is still very fragmentary and incomplete. The subject can be expanded indefinitely and a complete study will not be completed in the near future. The subject is further complicated by such factors as dispersibility, penetratability, and perhaps more important the size of the colloidal particles.

True solutions rarely soften. It is to colloids the softening agents owe their potency and to colloidal chemistry that chemists will depend to a considerable degree for advances in this field.

## DISCUSSION

*Dr. Ernest Barbour*: These samples that you are submitting, are they 4 x 4's or 2 x 2's?

*Dr. Mosher*: I believe they are 4 x 4's, but I am not certain. Is Dr. Flynn in the house?

*Dr. Flynn*: They are 4 x 4's.

*Dr. Barbour*: It would be more interesting if they were 2 x 2's, for the simple reason that the pulling power or the contracting power of crepe twist is increased when it is woven 4 x 4 rather than 2 x 2.

The next point I would like to ask you is this: It shows that the 1 x 3 gives you the better pebble, owing to the gelatin. As you know, I am not a chemist, but I do know this much; that there are degrees of gelatin—and there are gelatins that are no longer gelatins. They are glues. The source of those glues we don't know, but we know of their effect.

I am going back now ten or twelve years ago when we could not throw rayon crepe because the twist would slide up the thread. That was the object of introducing gelatin. We know why they introduced gelatin. We know why they introduced oils. And I would like you to express yourself, before the night is out on the kind of oils that should be mixed with gelatin—coconut oil, olive oil, linseed oil, or other oils.

Another thing is that the throwster has much to do with the weight of his flier. You realize that point?

*Dr. Mosher*: Yes.

*Dr. Barbour*: Now since then, in the way of softening, we have had decatizing of rayon fabric, which is simply a confining of the steam between blankets, to soften that cloth. Those are the points I would like to bring out in a practical sense without going into all of these chemical expressions.

*Dr. Mosher*: The oil best adapted for plasticizing gelatin is one possessed of high viscosity and good stability with the ability to resist oxidation and atmospheric agencies. The oil moreover should in itself possess the ability to form an integument about rayon which would furnish reenforcing strength. Coconut oil of suitable quality is an example of an oil suitable for this purpose, if it is properly prepared and proerly emulsified.

Gelatin and glues are derived from the same precursor and differ only in the degree of degradation. Gelatins have the more complex structures and form films possessed with the greater tenacity.

*Dr. Barbour*: Doctor, I have another question that many throwsters do not realize. There are a good many questions regarding the soaking and lubricating of rayon yarn in throwing. The baths get weaker. I am afraid that many of the throwsters do not try to establish the correct ratio between the gelatin and oil.

*Dr. Mosher*: A common cause of non-uniformity in the pebble of rayon crepes occurs because of improper adjustments in a standing bath. Many throwsters maintain this system of soaking. It is essential that the type of oil used in this system and the size be of such a character that they will exhaust uniformly. Rayon yarns should not selectively absorb or repel either the oil or the size. If such does occur the bath becomes either richer or poorer in one or in both components and the initial ratio of size to oil is altered and the soaked yarns are apt to possess different crepeing properties. The selection of a suitable oil and size will obviate this difficulty.

*Chairman Baxter*: Are there other questions?

*Mr. De Groot*: Are you familiar with the product Sapamine K W. We know it is a soap like amine. But where do we get its softening properties from? There are a number of products said to be like it, but from my point of view I don't think there is anything that comes up to it in absorption properties. I am not advertising it, but would like to have it explained to me.

*Dr. Mosher*: Sapamine K W is a long chained aliphatic compound having the formula $C_{17}H_{33}CONHC_2H_4N(C_2H_5)_2HCl$ or something similar. I am not in a position to state to just what group or grouping the properties of Sapamine depends. Our work has not progressed to a

point that we can prophesy whether a fatty acid derivative will possess softening or absorption properties. It is probable that the arrangement of radicles on the terminal carbon atom of the oleic acid from which Sapamine is derived account for its properties.

*Mr. De Groot*: Does your branch deal with that?

*Dr. Mosher*: It does in a certain way. There are rarifications and complexes in a study of a simple fatty acid which it would require a lifetime to complete. You can extend groupings and modifications of groupings to a carboxyl radical indefinitely. The sapamine that you alluded to is one of the more complex chemical structures.

*Dr. Barbour*: Will you explain to the gentlemen present the advantages and disadvantages of decatizing rayon fabric, in the finishing of rayon fabrics.

*Dr. Mosher*: Fabrics are decatized to produce a more mellow, more subdued luster, to even and level pebble and also to add to the softness of the goods. Unfortunately this acquired softness is only transient and much of it disappears within a few weeks. The improvement in the pebble of the cloth, however, is permanent as is the partial modification of the luster. The decatizing machine was developed to add luster to wool. It is a rather surprising fact that instead of lustering rayon, it actually subdues its brilliance.

*Mr. Sussman*: Have you used any other means of determining the degree of softness other than hand feel?

*Dr. Mosher*: We have estimated softness by both hand feel and by a flex-o-meter. Also in some cases by the angle of flexing upon the application of a certain force.

Softness is not the only element of hand. It is only one characteristic. Body, compressibility, surface lubrication and other properties are of importance. It is difficult to estimate hand by hand feel alone.

*Mr. Schmeidler*: Referring to your statement on the location of the sulfate ion in the double bond compound. Is there a very pronounced difference in the softness imparted, dependent on which one of the carbon atoms the sulfate is attached to?

*Dr. Mosher*: It is observable by hand feel.

*Mr. Schmeidler*: Is it possible in manufacturing, by various controls, to control which one of the two isomers predominate?

*Dr. Mosher*: It is not possible to do so quantitatively. It may be possible under certain conditions to so adjust a sulfating operation to intentionally get a greater amount of one particular isomer.

*Dr. Barbour*: Will you explain one thing to the audience and myself? Why does the application of excessive heat in finishing rayon fabrics have a tendency to make the goods papery?

*Dr. Mosher*: I have no explanation to offer. I suppose that dehydration modifies the lattice work micellur structure in some way.

*Dr. Smith*: I think that the explanation undoubtedly is that if you take all of the water out of the cellulose compounds you can never get it back again. Excess drying is a dehydration that is not reversible and is undoubtedly a big factor in the drying temperature—in the finishing of rayon and acetate both.

*Mr. Benzing*: Has the softening experiments been tried on Bemberg or just Viscose?

*Dr. Mosher*: Most of our work has been on Viscose.

*Mr. Benzing*: Would the softening effect be parallel on both Bemberg and Viscose?

*Dr. Mosher*: I would expect it to.

*Dr. Smith*: I would like to thank Dr. Mosher for this summary of the creping problems and the creping properties, and to remind you all that the fact that the throwsters are thoroughly aware of these problems is indicated by this growing research which has been going on for a year, and which I think within the next three months will give us the answer to some of Mr. Barbour's questions and some of our own questions, on which of these factors are the sensitive ones and which are not the sensitive ones in ordering the crepe.

I happened to have the pleasure of sitting in on a committee and seeing some of the fabrics the committee had woven, varying just one condition—temperature of drying, gelatin or a number of other things. It has been interesting to us to see some of the things we all thought theoretically were very important, that do not seem to make a bit of difference, and others that we thought were not quite so important seem to make a decided difference.

Within the next six months I think that work will be available to the public through one of our publications and I think it is going to be of great interest to all of us and will hook in with the things Dr. Mosher has so clearly summarized for us. (Applause)

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## MEETING, PHILADELPHIA TEXTILE SCHOOL STUDENT SECTION

THE regular meeting of the Philadelphia Textile School Student Section was held on March 3, 1937 at 3:00 P.M. Mr. John Hennessey of the General Dyestuff Co. gave an interesting lecture on "Algosols and their Application."

Respectfully submitted,

WAYNE F. FRY, *Secretary.*

## MEETING, PHILADELPHIA SECTION

THE fourth of the 1936-1937 season meetings of the Philadelphia Section was held on Friday, March fifth, at the Penn Athletic Club in Philadelphia.

The principal items of interest were talks by Dr. Harvey A. Neville, associate professor of chemistry, Lehigh University, and member of the Sub-Committee on the Chemistry of Wool Fiber of the A.A.T.C.C. on the subject of "Colloid Chemistry: Why its Principles Obtain in Textile Processing,", and by Mr. George Eckhardt of Farnsworth Television Inc., on the subject of, "Recent Developments in Television."

Dr. Neville used slides and gels of varying character to illustrate his remarks, and while assuring his audience that there was neither mystery nor secrecy involved, and with the occasional remark, "It may not do it," nonchalantly proceeded to cause gels to become liquid, liquids gel, colorless liquids to become colored and gels to burn.

Mr. Eckhardt's remarks were interesting, and at times impressive, especially when he mentioned that a two and one-half million per second electrical impulse was required for sending or transmitting images via the Television route.

The usual informal dinner preceded the meeting. At this 95 were present. 102 attended the meeting.

Respectfully submitted by,

CHARLES A. SEIBERT, *acting for the secretary.*

## MEETING, NEW YORK SECTION

THE fourth regular meeting of the New York Section was held on Friday, February 26th, 1937, at the Swiss Chalet, Rochelle Park, N. J., at 8:00 P.M. The usual informal dinner was held at 6:30 P.M. preceding the meeting.

Dr. F. Bonnet of the Viscose Company spoke on the "Dyeing and Finishing of Spun Rayon." The usual open discussion followed immediately after the presentation of his paper. A rising vote of thanks was extended to the guest speaker.

Mr. J. J. Sokolinski, Treasurer, submitted his financial report.

Our Chairman, Mr. George L. Baxter, referred to the delinquent list for non-payment of dues which the Secretary recently received from Dr. H. C. Chapin. He mentioned that if any of the members are in doubt regarding payment of dues, they should communicate with the Secretary.

A motion was proposed by Dr. Smith and seconded by Dr. J. Meili, authorizing the Secretary to purchase tags to be supplied to the members at our meetings for identification purposes.

Dr. J. E. Meili, Chairman of the Program Committee, referred to our next meeting which is to be held at the Chemists' Club, New York City, on March 26th. He gave a brief outline of the paper "Consumers' Problems," which is to be presented by Mr. E. Freedman of R. H. Macy & Company, Inc.

There was a total attendance of ninety (90).

Respectfully submitted,

P. J. KENNEDY, *Secretary.*

## MEETING, NORTHERN NEW ENGLAND SECTION

A MEETING of the Northern New England Section was held on Friday, March 5, 1937, at the University Club in Boston, Mass. About sixty members attended the dinner and eighty members were present for the technical program which followed.

Dr. Draves, our Chairman, announced the selection of the Nominating Committee for the selection of officers for the following year. This committee is composed of R. E. Derby, chairman, W. R. Moorhouse, C. E. Nutting.

Due to the illness of Dr. Wanda K. Farr, chemist at the William Boyce Thompson Research Institute, Dr. Wayne Sisson of the same institution presented a substitute paper on the X-Ray studies of the formation and growth of cellulose in the plant fiber. In addition, Dr. Sisson showed many of the microscopic slides which had been prepared by Dr. Farr and also presented additional X-Ray photographs of rayons and mercerized cotton. Dr. Sisson's talk was very interesting and afforded the members of this Section an opportunity to learn of the fundamental research undertaken by the William Boyce Thompson Research Institute.

Another paper entitled "The Dyes of Our Ancestors" was presented by the President of our society, Mr. William H. Cady. This paper was a scholarly presentation interspersed with many humorous historical anecdotes and was much enjoyed by the members present.

Respectfully submitted,

JOHN N. DALTON, *Secretary N.N.E. Section.*

## WINTER MEETING, SOUTHEASTERN SECTION

THE Southeastern Section of the American Association of Textile Chemists and Colorists held its winter meeting at the Ralston Hotel, Columbus, Georgia, Saturday evening, February 13, 1937.

After a dinner at 7:00 P.M. at which between sixty and seventy members and guests were present, a short business meeting was held. The Nominating Committee, consisting

of Mr. L.L. Bamberger, chairman, Mr. M. T. Johnson and Dr. A. R. Macormac, reported the following recommendations:

Chairman—E. A. Feimster
V. Chairman—S. I. Parker
Secretary—A. R. Macormac
Treasurer—Fred Crayton
Councilor—C. A. Jones
Member of the National Nominating Committee— A. K. Haynes.

These officers were elected unanimously. The membership of the sectional executive and membership committee was left to the discretion of the new chairman. Mr. James Pike, President of the Lambda Chapter of Phi Psi, extended an invitation to the Section to hold its Spring Meeting at Alabama Polytechnic Institute, Auburn, Alabama. The invitation was accepted and upon motion of Mr. Adam Fisher the date of the meeting was set for April 24.

There being no more business to come before the meeting, the following technical and scientific program was presented:

1. Mr. E. H. Grayson, of the Calco Chemical Company, presented a paper on "Collodized Vat dyes," illustrated by motion pictures.
2. Mr. G. M. Cox, of the International Nickel Co., presented a paper on "The Uses of Nickel Alloys in the Textile Industry," and a motion picture film.
3. Mr. Sidney Edelstein, A.A.T.C.C. Research Fellow at the University of Chattanooga, gave an informal report on Mercerizing Research.

After a brief discussion of some points in the various papers, Prof. C. A. Jones, the retiring chairman, reported on the national meeting in Providence. The invitation of the Southeastern Section to hold the 1938 national meeting in its territory was accepted by the National Council. This meeting will be held either in Dec., 1938 or the Spring of 1939. Mr. Jones emphasized the importance of preparing for this meeting well in advance, and urged all the members to give the incoming chairman the same whole-hearted support that they had given him in the past several years.

There being no further business, the meeting adjourned at 11:15 P.M.

A. R. Macormac, *Secretary.*

## MEETING, NEW YORK SECTION

THE regular monthly meeting of the New York Section was held on Friday evening, March 19th, 1937, at the Chemists' Club, 52 East 41st Street, New York City, at 8:00 P. M. The usual informal dinner was held at 7:00 P. M. preceding the meeting.

Mr. Ephraim Freeman, former Chairman of our Section, was the guest speaker of the evening and he spoke on "Consumer Problems". His talk was most interesting and as a result many questions were asked by the members attending the meeting.

A rising vote of thanks was extended to Mr. Freedman.

It was suggested, if possible, the dinner preceding the meeting be served promptly at 6:30 P. M.

It was indicated that the New York council officers would appreciate suggestions from the members as to the type of technical subjects that might be of special interest to them.

It was also suggested that directions be published in the American Dyestuff Reporter for traveling to the Swiss Chalet, Rochelle Park, N. J., from New York City.

Dr. Meili, Chairman of the Program Committee, stated we may again look forward to a most promising meeting to be held in New Jersey next month, at which time we will hear two speakers, one on "Synthetic Resins" and the other on "The Scouring of Rayon".

Mr. L. S. Zisman, Vice-Chairman, acted in the capacity of Chairman at this meeting in the absence of Mr. G. L. Baxter, due to illness.

There was a total attendance of sixty (60).

Respectfully submitted,

P. J. Kennedy, *Secretary.*

# TEXTILE CHEMICAL SPECIALTIES

AGAIN the American Association of Textile Chemists and Colorists is preparing a list of textile chemical specialties for publication in our Year Book. It is the purpose of the Association not only to make conveniently available for its members a list of the chemical products which can be purchased in the American market for the processing of textile materials, but also to disclose the chemical nature of those products so that the chemist can use them with greater understanding. Since the list is published in the interest of our members for their information, there is no charge to the manufacturer or importer for the listing of products.

The policy expressed in the original resolution of the Council authorizing this department has been followed again: namely, that "The list of products for textile processing shall be limited to homogeneous substances for which the chemical formula or complete qualitative composition or method of manufacture is given by the seller." Generally speaking, only products with proprietary names or specific textile uses have been included. But even then, many products which are widely used in the textile industry at great economy and with much advantage, such as sulfonated oils, soaps and many other products, have not been included because they are so common that list-

ing would have no particular instructional value and their great number would make the list too long. Furthermore, there are many meritorious products on the market with secret compositions of which the disclosure would invite unfair competition since they can not be protected by patent. For these reasons, the omission of a product from the list must not, under any circumstances, be taken as a reflection upon its usefulness in a textile mill.

The chemist using the tables must remember that the information given concerning the various specialties with respect to uses and composition is obtained mostly from the firms offering them for sale and cannot be vouched for by the committee. The value of a textile specialty for a given purpose must be determined on its own merits since the committee merely repeats information which it feels reasonably certain is true. The listing of a product for a specific purpose implies no guarantee on our part of the practical usefulness of the product for the purpose indicated.

The committee earnestly solicits the cooperation of all manufacturers and importers for the improvement of this authentic list of chemical specialties available in America for the processing of textile materials. Those who have not participated thus far in the work are invited to send the necessary information at once to the Chairman for inclusion in the next Year Book. This information should be tabulated as follows:

1. Firm abbreviation, limited to four letters and conforming to, or not interfering with, the abbreviations used in the Tabulation of American Dyes.
2. Proprietary or trade name under which the chemical specialty is sold.
3. Principal uses, very briefly.
4. Chemical nature:
   (a) Systematic chemical name or chemical formula, if an essentially pure substance; or
   (b) Complete qualitative composition, if a mixture; or
   (c) Method of manufacture, very briefly, with names of raw materials.

CARL Z. DRAVES, *Year Book Committee.*
273 Converse Street, Longmeadow, Mass.

# UNEMPLOYMENT REGISTER

**Members of this association, who are without employment, should forward to the secretary a statement as to their qualifications and experience. This information will subsequently appear on these pages with an identifying key number. Employers are also requested to file with the secretary or the American Dyestuff Reporter any vacancies which may occur in their businesses.—H. C. Chapin, Secretary, Lowell Textile Institute, Lowell, Mass.**

**Key: A—Laboratory and research; B—Dyeing or printing; C—Finishing; D—Sales; E—Instruction; F—Executive.**

**NOTE: PERSONS WHO HAVE OBTAINED EMPLOYMENT SHOULD NOTIFY THE SECRETARY OR THE AMERICAN DYESTUFF REPORTER AT ONCE.**

**Prospective employers may file vacancies either with the secretary or the American Dyestuff Reporter.**

**A-1**

*Education*—B.T.C., Lowell Textile Institute.

*Experience*—Two years as chief chemist in cotton mill. Experienced on direct, vats, naphthols, sulfur, basic and developed colors. Two years' experience in protein, fat fiber and mineral control in grains and animal feedstuffs. Age 28.

**A-B-1**

*Education*—Graduate chemist and colorist from a leading textile institute. Speaks French fluently. High standing at school. Awarded 1st prize in chemistry. Member of honor society.

*Experience*—Knowledge of most processes of textile manufacturing and some experience in woolen and worsted piece and stock dyeing and color matching. Presently employed in other department but wishes to get into laboratory or dyehouse.

**A-B-5**

*Education*—Graduate of the University of Lausanne, Switzerland. Doctor's degree in Chemistry. Knowledge of French and German.

*Experience*—Eleven years with large bleaching, dyeing, printing and finishing plant as assistant Chemist and then Chemist in charge of the Laboratory. Experience in dyeing and printing cotton and rayon fabrics; research and analytical work. Woman.

**A-B-7**

*Education*—Evening school in textile dyeing.

*Experience*—2 years laboratory in dyehouse; 9 years dyer and foreman on hosiery, ribbons and rayon; 2 years assistant to superintendent. Can handle help efficiently. Desires position as supervisor or demonstrator of dyestuffs. Age 30; married. Prefers vicinity of New York.

**A-B-C-1**

*Education*—B. S. in Chemistry, Massachusetts Institute of Technology.

*Experience*—7 years with a prominent worsted mill as assistant chief chemist, chief chemist, and superintendent of dyeing and wet finishing. Thoroughly familiar with chemical problems of worsted industry. Age 33; single. Location unimportant.

**A-B-C-2**

*Education*—Graduate of Lewis Institute of Engineering of Chicago and graduate of Philadelphia Textile School (Chemistry and Dyeing department).

*Experience*—Has had extensive experience as assistant chemist and colorist in silk printing, dyeing and finishing; also dyeing raw stock wool; and dyeing and finishing cotton and rayon. Age 30; married; references.

**A-B-C-3**

*Education*—Graduate, Chemistry and Dyeing Course, Lowell Textile Institute, 1934.

*Experience*—Has experience as chemist; dyer of union knit goods (cotton and woolen); experienced bleacher on both. Has handled Tube-Tex processing on cotton and rayons. Single; will go anywhere.

**B-3**

*Experience*—Foreman piece dyer for the past 21 years. Can dye the following: celanese, rayon, cotton backs, wool, silk and mixed fabrics. Has knowledge of finishing and laboratory work.

**B-4**

*Experience*—Foreman dyer in charge of ribbon dyeing for 20 years. Experienced on silk, cotton, rayon, acetate yarn. Age 41; will go anywhere.

**B-F-1**

*Experience*—As executive had charge of the dyeing of ribbons and piece goods for 6 years; spun silk yarn, fast and resisted dyeing for 8 years; hosiery for 12 years. Has been quite successful in all three of these mills. Age 50 married. Will go anywhere.

AMERICAN
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## TEXTILE DRYING RESEARCH

READERS of the REPORTER who have watched the progress of the U. S. Institute for Textile Research in arranging for the study of the problems involved in the drying of textiles will be interested to learn that final plans are now being made to actually start the project. The subject will be studied at the National Bureau of Standards under the auspices of the U.S.I.T.R. and under the supervision of the following administration committee: G. E. Hopkins, technical director, Bigelow-Sanford Carpet Co., chairman; Dr. A. C. Walker, Bell Telephone Laboratories, and Dr. F. Bonnet, The Viscose Co. The Administration Committee and representatives of the Bureau of Standards for this study will select a director for the research, and prior to starting of actual work a meeting of co-operators will be held in Washington, D. C., at which they and those responsible for the study, including the Research Council of U. S. Institute, will confer regarding the research program and its possible revision or expansion, and the selection of an advisory committee for the study. Co-operators will also have an opportunity to inspect the laboratory and other facilities at the Bureau of Standards for this work, and to learn of other drying studies that have been conducted there and of their results.

The drying research was made possible by 50 co-operators, the income of whose contributing memberships ($100 a year each) are credited to an initial fund of $5,000. These co-operators and others who may yet become contributing members for this study will receive confidential progress reports of results, and will have sole access to these results until a year after completion of the study. In view of the many features of this research for which there is no scientifically reliable information, and of the vital importance of safe and efficient drying in textile processing it is expected that the number of contributing members for this study will be largely increased now that the main details of its organization are known.

The purposes of this study are briefly described in the program as follows: "To ascertain some of the fundamental facts underlying the design of drying equipment for textiles. To develop information about the way textiles can be dried with maximum efficiency and minimum injury to the material. To assist in applying this information in individual plants." The problems to be studied are (a) regain, (b) effect of regain, (c) effect of machine variables, (d) effect of impurities.

As soon as results are ready for practical application, co-operators may have the advantage of the advice of the director on a consulting basis, the latter visiting their mills and conferring with their technicians when deemed requisite. The latter is a service made available for the first time in connection with U. S. Institute researches. This also is the first co-operative research of U. S. Institute that has been wholly financed by members.

Like other co-operatively financed studies of U. S. Institute the drying research was approached by an open conference of all interested parties, held in May of last year in New York City. By unanimous vote U. S. Institute was requested to proceed with the preliminary organization and financing of the study. A committee consisting of W. E. Emley, Chm., Alban Eavenson and Dr. H. DeW. Smith has had charge of initial plans, and Secretary C. H. Clark of the financing. Another open conference on the subject was held in conjunction with U. S. Institute's annual meeting last November. Both of the conferences were the source of a large amount of valuable literature on the subject all of which was published in *Textile Research* and in the *Trade Press* of this and foreign countries. The wide publicity thus given to the need of such a study has exerted much the same valuable influence as that which has followed U. S. Institute's study of sizing and sizing materials: It has already caused many mills to survey and attempt to improve their drying, and has been followed by important improvements in drying machinery and control instruments.

## KNITTING ARTS EXHIBITION

THE Thirty-third Annual Knitting Arts Exhibition, held under the auspices of the National Association of Hosiery Manufacturers and the Underwear Institute, will be held at the Commercial Museum in Philadelphia during the week of April 19th. The industry's leading manufacturers of knitting, dyeing and drying machinery, mill supplies and allied products, will exhibit their latest designs, processes and mechanical equipment. Indications are that this will be one of the largest knitting exhibitions ever held. Readers of the REPORTER who are engaged in the wet processing of knit goods will find much of interest to them at this exhibition and you are cordially invited to make our booth your headquarters during your visit.

# U. S. Patents Covering Silk Weighting

*(Continued from page 180)*

**1,496,064**

Process of Treating Silk.

Eugene L. Maupai. June 3, 1924.

A process of treating silk which consists in first hardening it with metallic salt solution, such as chromium chloride, ferrous nitrite of iron or alum; then subjecting to any well known weighting process, such as impregnation in a tin solution. It is then washed, neutralized with an alkali, dried and woven, and thereupon degummed and dyed.

Claims a higher percentage of tin weighting; less tendency of tendering the fiber; better color absorption and retention; dispenses with throwing the silk.

**1,496,065**

Process of Treating Silk.

Eugene L. Maupai. June 3, 1924.

Process consists of partially weighting the silk by impregnating in a tin solution until the silk holds 20-25%. Then subject to an alkali such as commercial sodium phosphate ($Na_2HPO_4.12H_2O$) to neutralize acids. Subject further to a hardening treatment so as to produce an insulation or hardening of the fatty or cereceous substances. For this purpose use an aqueous solution of chromium chloride, ferrous nitrite of iron or alum, or process described in U. S. Patent 1,352,014. Silk is washed again and given a final weighting treatment, neutralized and either washed and dyed, or woven, degummed and dyed in the piece.

Claims the fibres will hold a very high percentage of metallic weighting substances without throwing the silk, that the silk absorbs colors more readily and colors remain fast to alkali and light.

**1,536,564**

Process of Treating Soupled Silk and Product Thereof.

C. P. Cole, Sr. May 5, 1925.

Raw silk is cleaned at 28° C. in soap bath, consisting of 600 gallons water, 30 pounds green olive oil soap, 5 pounds sal soda, 1 gallon ammonia. Wash in two changes of soft water and a final wash of 600 gallons water, 3 gallons muriatic acid. Dry in extractor. Treat with boiling solution of cream of tartar or magnesium salt. Weight in bath of tin tetrachloride for 1 hour, extract and wash with cold water. Place in bath containing 600 gallons water and sodium phosphate made up to 4-5° Be for 1 hour. Remove and wash twice with soft water and then treat with 600 gallons water and 3 gallons muriatic acid, extract. Above tin weighting may be repeated from 1-5 times. Wash, extract and treat with sodium phosphate bath for 1 hour. Then wash 3 times with water 600 gallons, sal soda 10 pounds, followed by a 1-hour immersion in sodium silicate 4-5° Be, water 600 gallons. Three washes in soft water, then bath of water 600 gallons, sal soda 40 pounds, ammonia 3 gallons, for ½-hour each. Then a bath of water 600 gallons, 50 pounds green olive oil soap, ammonia 1 gallon, for 1½ hours. Finally wash with water, muriatic acid, extract and dry. Weave, with or without degumming, and dye.

**1,565,390**

Process for Weighting Silks.

Anthony Pepper. December 15, 1925.

A process for weighting silk fabrics which comprises placing the fabrics in a solution of stannic chloride of 20° Be for 1 hour, then washing the fabrics, treating the washed fabrics with a solution of sodium phosphate of 7° Be at 150° F. for 1 hour, then washing the fabrics, treating the washed fabrics with a 3% acetic acid solution at 160° F. for ½ hour, washing fabrics with cold water and treating with a solution of lead acetate at 3° Be at 150° F. for 1 hour and then washing, followed by a cold solution of sodium phosphate for ½ hour.

**1,579,628**

Process of Weighting Fibers and the Product Thereof.

Olav Berg and Max Imhoff. April 6, 1926.

The process of weighting fiber which comprises preliminary weighting the silk with tin by any known method which includes the use of a fixing bath, and thereafter treating the fiber with a soluble lead compound.

**1,602,840**

Process of Weighting Silk.

James Roscow. October 12, 1926.

The method of weighting silk which consists in wetting the silk with a solution of a soluble barium salt, then converting the wetted silk to a dry state, and then causing a solution of a soluble sulphate to react on the residual barium salt.

**1,634,012**

Process of Weighting Silk Fabrics.

Olav Berg. June 28, 1927.

A step in the process of weighting silk fabrics which consists in treating silk fabrics with a weak solution of acetic acid, treating the fabrics with a solution of lead acetate, and then treating the fabrics with a solution of sodium phosphate.

**1,666,501**

Method of Treating Silk.

J. C. Mackey and J. S. Kaufman. April 17, 1928.

Weighted silk which has tin phosphotungstate in the fibers to weight the same, said weighted silk being a neutral base having the same properties as regards dyeing and printing as exist in unweighted silk.

**1,674,356**

Process for Weighting Silk.

Egon Elod. June 19, 1928.

A method for loading silk comprising the steps of incorporating in the silk fiber a double salt of alkali-metal formate and tin salt and washing the treated silk to hydrolize the tin salt.

**1,684,286**

Method of Weighting Silk and the Product Thereof.

R. J. Obrien, Jr. September 11, 1928.

The method of treating silk which consists in weighting the same by applying to silk threads rubber in solution, the rubber at the time of application being in a colloidal state.

**1,749,699**

Weighting of Silk.

Albert Feubel. March 4, 1930.

In processes of weighting silk by means of salts of heavy metals, the step which consists in treating unweighted silk with a solution of a basic aluminum compound containing nitrate radicles.

**1,810,238**

Loading Silk.

Rene Clavel. June 16, 1931.

An apparatus for loading silk or silk-containing textile materials comprising a tank forming a reservoir in the lower portion thereof; a plurality of liquid supply vessels; means for connecting said vessels with the tank to supply liquids thereto; means in the tank for supporting the textile materials to be loaded; means for circulating fluids thru the materials; and means for extracting the fluid from the textile materials thru the supporting means for the materials.

**1,823,606**

Treatment of Silk.

Stephan Jost. September 15, 1931.

A method for increasing the permanence and stability of completely weighted and dyed silk fiber consisting in treating the fiber with a basic bath free from formaldehyde compounds, after the weighting to neutralize any remaining acidity of the fiber.

**1,835,920**

Process for Loading or Impregnating Silk and Silk-Tissue.

Markus Werder. December 8, 1931.

A process of impregnating silk and silk tissues with chemical substances for the purpose of increasing the weight thereof, consisting in first treating the material in the usual manner with a tin chloride solution and immediately thereafter with an acid solution of ammonium phosphate.

**1,845,037**

Loading and Dull-Lustering Silk.

Rene Clavel. February 16, 1932.

A method for loading and dull-lustering natural and artificial silk in any form which consists in treating the silk to be loaded successively with aqueous solutions of alkaline reacting phosphates of an alkali forming metal and heavy metal compounds forming white compounds insoluble in water with the phosphate used.

**1,847,816**

Loading Silk Containing Fabrics.

Rene Clavel. March 1, 1932.

A method for loading silk containing fabrics with metal compounds which comprises printing the fabric with a paste containing a water soluble heavy metal compound usual for loading silk admixed with thickeners; and washing the printed fabric with a solution of a fixing and precipitating agent for the heavy metal compound of the paste.

**1,858,379**

Process for Weighting Textile Material.

H. W. Stiegler, May 17, 1932.

The process of weighting textile material which comprises treating it with a dilute water solution of a hydrolizable metal salt, said solution containing a substance furnishing negative ions common to said metal salt in an amount sufficient to inhibit effectively the hydrolysis of said salt.

**1,858,474**

Silk Improved in Weight, Durability, and Appearance and Process for Obtaining the Same.

F. W. Weber. May 17, 1932.

The process of weighting silk which comprises treating the silk fiber with a solution of a tin compound and treating the same with a soluble phosphate, then treating the fiber with a solution of a salt of a rare earth metal, and again treating the fiber with a soluble phosphate.

**1,873,635**

Method and Apparatus for Finishing Cloth.

R. D. Hope and Henry Ruegg. August 23, 1932.

In fabric treating apparatus, the combination of an elongated tank containing a liquid with which the fabric is to be treated, means for conveying the fabric from end to end of the tank in the form of a helix on an axis lengthwise of the tank with portions of the convolutions of the fabric in said helix entering the liquid in the tank, and means for causing the liquid to flow counter-current to the movement of the portions of fabric in contact with the liquid, said flow being generally transverse to the axis of the helix.

**1,878,507**

Process for the Recovery of Tin Compounds in the Art of Loading Silk.

Walter Meitner. September 20, 1932.

A process for recovering tin from waste phosphate baths in the art of loading silk which comprises passing the said phosphate baths thru a filtering device charged with active aluminum hydroxide, removing the filtrate and washing the filtering device with a solution capable of dissolving the tin.

**1,896,381**

Method for Treating Natural and Artificial Silk and Products Obtained Thereby.

F. W. Weber and Eugene Schaefer. February 7, 1933.

As a base for weighting both natural and artificial silk fibers, an aqueous solution of the basic chlorides of tin and of a metal other than a rare earth metal, said latter metal forming a soluble chloride and an insoluble phosphate.

**1,896,858**

Process for Weighting Textile Fibers and Product Obtained Thereby.

F. W. Weber. February 7, 1933.

As a base for the weighting of both natural and artificial silk, an aqueous solution of a basic tin chloride and a basic rare earth metal chloride.

**1,902,226**

Weighted Silk and Method of Weighting the Same.

Victor Froelicher. March 21, 1933.

Process of weighting natural silk, which comprises weighting such silk with a tin phosphate, thereafter applying to the said silk an aqueous solution of a water soluble lead compound, and thereafter applying to the said silk an aqueous solution of an alkali metal borate selected from the group consisting of sodium and potassium borates.

**1,902,777**

Process for Weighting of Natural and Artificial Silk Fibers.

Harry Hintze. March 21, 1933.

The process of weighting natural and artificial silk fiber which comprises treating said fiber in separate baths with tin-weighting agents and fixing baths, subsequently treating the fiber with aqueous solution containing sodium acetate with isopropylated betanaphthaline disulphonic acid, and with dichloride of lead; the presence of at least one material selected from the group consisting of phosphoric acid, disodium phosphate and trisodium phosphate, and finally treating said fiber in a bath of aqueous carbonate of ammonia.

**1,920,063**

Process for Weighting Natural Silk.

Rene Clavel. July 25, 1933.

A process for weighting natural silk, comprising the step of treating the material with a metallic salt solution, freeing it from excess thereof and then introducing it without washing, deacidification or neutralization, directly into a bath containing an acid phosphate of a fixed alkali, and finally neutralizing the material.

**1,926,063**

Treatment of Cotton, Silk, or Artificial Silk, or Goods Made Therefrom.

E. C. Rossiter and W. C. Davis. September 12, 1933.

A process for providing cotton, silk, artificial silk and goods made therefrom, with a filler, which comprises impregnating the material with an aqueous solution or suspension of a customary filling material containing in addition an initial condensation product of formaldehyde and a carbamid, and subsequently converting the initial condensation product into a substantially water insoluble state.

**1,955,440**

Method of Weighting.

Theodore Scheuermann. April 17, 1934.

In a method of tin weighting the step of fixing the tin compound which comprises subjecting the material containing the compound of tin to an aqueous solution containing a phosphate and a salt of an alkali metal to accelerate the reaction to completion.

**1,966,991**

Method of Weighting Silk.

F. W. Miller. July 17, 1934.

The process of weighting silk comprising subjecting degummed natural silk to an initial tin phosphate treatment consisting of the successive steps of immersing the natural silk in stannic chloride, hydrolizing the stannic chloride impregnation, treating the silk with disodium phosphate, and removing the excess of the latter by washing; then repeating the tin phosphate treatment no less than two times; then washing the tin phosphated silk with acetic acid solution; then treating the silk with zinc acetate followed by washing; thereafter treating the silk with disodium phosphate thereby impregnating the silk fiber with a compound zinc-stanno-phosphate; and thereafter treating the resulting product with sodium silicate to form the final product.

**1,970,736**

Method and Device for Loading Silk Containing Fabrics.

Rene Clavel. August 21, 1934.

A method for loading silk containing fabrics in which the fabric to be loaded is passed continuously thru baths containing in succession a solution of an organic acid, tin tetrachloride and alkali-metal phosphates.

**1,990,449**

Weighting Fibers Such as Those of Silk.

Olav Berg, Max Imhoff and O. E. Heiberg. February 5, 1935.

Tin weighted fibers are treated in a solution of an organic zinc salt such as zinc acetate and then with sodium phosphate.

**1,990,450**

Weighting Fibers Such as Those of Silk.

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Similar use of a zinc salt as described above, using the zinc acetate in a buffer solution with subsequent treatment of the material in a solution of sodium silicate. A soluble lead compound also may be used.

**2,010,324**

Treatment of Fiber and the Product.

B. E. Roetheli. August 6, 1935.

A process of weighting silk fiber with lead which comprises treating a fiber which is free from other weighting materials with a solution containing a basic substance and a lead compound, said solution having a basic reaction, and subsequently treating the fiber to fix a water insoluble lead compound thereon.

# TECHNICAL NOTES FROM FOREIGN SOURCES

### The Present Status and Viewpoints regarding Substantive Dyeing

*Dr. W. Weltzien and Dr. K. Schulze—Monats. f. Seide u. Kunstseide* 40,288 (1935).—Substantive dyeing at the present time still holds a fundamentally important position in reference to the artificial fibers, due to the good fastness-properties of many dyestuffs now available, and the simple and cheap methods suitable for carrying out such dyeings; in fact, perhaps, substantive dyeing exceeds in extent and importance any other method of dyeing. When the artificial fibers were first winning their way into extended use, it is true, much trouble was encountered from unlevel, streaky dyeings; but it was soon recognized that the fault lay rather with the methods of manufacture of the fiber, than with the dyeing process; and improvements in methods of synthesis have provided a fiber which, in general, is not of itself liable to give such trouble in dyeing. Some desirable dyestuffs, however, proved to be troublesome even with uniform fiber, and other usually well-behaved dyestuffs proved to be sensitive to alterations in the conditions prevailing during dyeing. Much valuable work has been done, during the past ten years particularly, in running down and overcoming the causes of unsatisfactory dyeing of substantive dyestuffs upon rayon, but the situation is not yet wholly satisfactory. The many unsolved problems presented by the dyeing of goods consisting of mixtures of the synthetic with the natural fibers, for example, will suggest how much work remains to be done.

The authors proceed to discuss the subject under three headings: (a) substantive dyestuffs and their preparation in a pure state, (b) substantive dyestuffs in solution, and (c) the process of dyeing.

a—Various studies of late years have brought out the fact that the use of technical standard dyestuffs has been the cause of difficulty and uncertainty in making exact measurements of various factors. In many cases, the degree of purity of the intermediates involves fluctuations from lot to lot, and so the dyestuffs produced from them contain more or less impurities (other dyestuffs of different tone), which in some cases are not substantive in nature at all. The author, several years ago, found that the technical Brilliant Benzo Blue 6B (identical with Chicago Blue 6B) frequently contained a red component, which accumulated in the exhausted baths, and did not dye cellulose directly; while a sample of really pure Brilliant Benzo Blue 6B furnished by the makers (the I.G.) did not contain this red dyestuff. It is obvious, then, how much confusion such a situation will cause in an exact study involving, say, determination of the amount of dyestuff taken up, by colorimetric measurement of the amount of dyestuff still left in the partly exhausted bath. Another difficulty is caused through the presence in the dyestuff of the ordinary inorganic impurities, chiefly the chloride or the sulfate of sodium. These substances, it is now known, have modified the process, and corrupted the results of exact studies of the dyeing process, which have been carried out.

There are two ways, in general, of purifying a substantive dyestuff. One consists in synthesizing the dyestuff from absolutely pure intermediates, which does not often prove feasible; the other consists in freeing a dyestuff, prepared from as pure intermediates as possible, from its electrolytic impurities, by dissolving in water, "salting" out with sodium acetate, washing the precipitated dyestuff with saturated sodium acetate solution until the washings come through free from chlorine and sulfate, then drying the paste completely, and extracting the residual sodium acetate with hot alcohol, in which practically all substantive dyestuffs are insoluble.

There are two points next to be considered: that a number of substantive dyestuffs show less and less inclination to go from the fiber, as the amount of electrolyte present is diminished, and that, with decreasing concentration of electrolyte, the diffusibility of the dyestuff increases. The degree of diffusibility furnishes an index to the purity of the dyestuff.—*The paper is to be continued.*

# TRADE NOTES — NEW PRODUCTS

**● TECHNICAL CATALOGUE**

For the first time, there is now available a comprehensive catalog of technical books of all American and British publishers. Thousands of books are listed and each is fully described in the spiral-wire bound catalog No. 4 of the Chemical Publishing Co. of N. Y., Inc., 148 Lafayette St., New York City. Because of the expense in getting up this catalog, a nominal charge of 10c is made to cover mailing expenses.

**● SALES SURVEY**

Logan Grupelli of the technical sales division of the National Oil Products Company of Harrison, N. J., is conducting a technical sales survey throughout the United States. Mr. Grupelli, who is sales promotion and advertising manager of the industrial sales department of the company, will visit textile and paper manufacturing centers.

**● JOINS QUAKER CITY**

Roy E. Estes, former football star of Georgia University, is now associated with the Quaker City Chemical Company, of Knoxville, Tenn., as a representative to cover Georgia, Alabama and Mississippi. Mr. Estes will make Chattanooga, Tenn., his headquarters.

**● NEW LOCATION**

The Fulton Dye & Import Company, Inc., Sole Agents for the United States of "Centrale des Matieres Colorantes", Paris (France), have increased their facilities and are unifying their offices, laboratories, and warehouse at 250 West Broadway, corner Beach Street, New York City.

## • GENERAL RELEASE

General Dyestuff Corp., 435 Hudson St., New York, announces release of the following product:

*Algosol Red IFBB*—an addition to the water soluble vat dyestuffs which, it is stated, will be of considerable interest in dyeing, both as a self shade and as a shading dyestuff for shirting blues which are made with Algosol Blue I B C. This new product, like the vat dyestuff from which it is derived, namely, Indanthrene Red FBB, is said to have very good fastness to light, chemick and washing. It is best applied by the nitrite process. This product is said to produce full reds of excellent fastness to light and very good fastness to washing and chlorine when printed according to the sulfocyanide-chromate-acid steaming process next to Rapidogen colors or according to the chlorate steaming process. Circulars Sol. 64 (for printing), Sol. 65 (for dyeing).

## • CATALOG OF APPARATUS

One of the more recent and valuable developments of the chemical apparatus industry has been the adoption of interchangeable ground glass connections for practically all purposes that might be desired in the assembling of laboratory apparatus.

Ace Glass, Inc., Vineland, N. J., has recently published a very complete catalog of the various pieces of apparatus and connections of interchangeable measurements which are of universal application in the assembling of laboratory apparatus of almost any desired combination.

## • SLIPNAUGHT FINISH

A new finish for rayon fabrics is one which is applied under U. S. Patent No. 2,051,156 granted to Hector C. Borghetty and assigned to the Aspinook Co. in Jewett City, Conn. The product is a synthetic resin which, when applied to rayon fabrics in water solution, is said to impart non-fraying and non-slipping properties to the threads. It is stated that the product does not affect the regular feel of the fabrics to which it is applied. Slipnaught-A, which is the name of the new product, will be supplied to other finishers. When applied to spun rayon and wool fabrics it is said to impart non-sag and non-stretch qualities.

## • S. O. C. M. A. MEETING

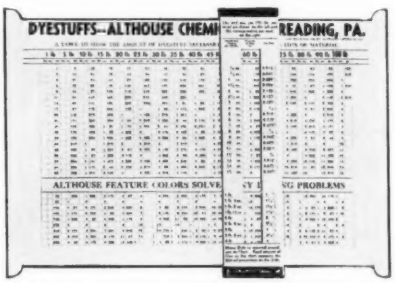
The regular monthly luncheon and meeting of the Synthetic Organic Chemical Manufacturers Association of the U. S. was held at the Chemists Club, New York City, on Tuesday, March 9, 1937, at 12:30 P. M. The secretary reported on various legislative and trade matters of importance to the association.

## • S. O. C. I. MEETING

The Society of Chemical Industry, American Section, will hold a meeting on April 9, 1937, at 7:45 P. M. at The Chemists Club, 52 East 41st Street, New York City. This is to be held jointly with the American Chemical Society. Mr. James G. Vail will preside. The speaker will be Professor James E. Kendall, head of the department of chemistry of the University of Edinburgh, who will be in America on a tour at that time. His subject will be "Liquids and Solutions", a field in which much has been done but which is open to many future possibilities. A dinner will precede the meeting, starting at 6:30 P. M.

## • DYERS SLIDE RULE

The Althouse Chemical Co., Reading, Pa., realizing the need of a quick and practical method for the determination of formulas in the dyehouse, has compiled the chart with vernier attached, one side of




which is shown in the illustration. With the use of this slide rule the exact amounts of dye for various quantities of material may be easily and quickly determined. Figures are given in lbs. and ozs. per 100 lbs. of material together with the corresponding percent and another table shows the amount of dyestuff in grams for dyers who prefer the metric system.

## • CARBIC RELEASE

Carbic Color & Chemical Co., 451 Washington St., New York, announces release of the following product:

*Indigosol Red IFBB*—a new member of the Indigosol series. It is said to possess excellent fastness to light and very good fastness to washing and chlorine. It is stated that it will be particularly useful for fast pinks, giving faster pinks than have been available with the other Indigosol Pinks. It is claimed that it will be of interest for the coloring of cotton, linen, and viscose and for mixed fabrics of these fibers as, in addition to its excellent fastness properties, the new dyestuff is said to possess relatively great affinity for the fibers mentioned. This is said to permit the more complete utilization of dyebaths when it is desired to produce light shades on the jigger, the open dye beck or the winch vessel. Rose and scarlet shades made with this color are much more intense than was the case with the older Indigosol Scarlet IB. It is stated that in all cases where dyeing of good fastness is required, it will be advantageous to replace Indigosol Scarlet IB by the new product as red component. Circulars Sol. 64 (for printing) and Sol. 65 (for dyeing).

## • DUPONT RELEASE

The Dyestuffs Division of E. I. duPont deNemours & Co., Inc. of Wilmington, Del., announces release of the following new product:—

*Celanthrene Pure Blue B R R*—a new acetate fiber dyestuff of a reddish shade of blue. It is equal in strength to Celanthrene Pure Blue BR and possesses similar dispersion properties. The general dyeing and fastness properties are identical to the B R type but the shade is noticeably redder. It is stated that this dyestuff may be applied to all types of acetate fiber materials such as satins, taffetas, knitgoods, and combination fiber crepes. It is believed that its chief use will be as a base for direct dyeing navies. Celanthrene is a registered trade mark of the duPont Co.

## • GEIGY RELEASE

Geigy Company, Inc. announces release of a circular describing the following new dischargeable Setacyl Direct Colors:—

*Setacyl Direct Yellow 5 G supra (patent applied for); Setacyl Direct Yellow 3 G supra, (patent applied for); Setacyl Direct Yellow R N supra (patent applied for); Setacyl Direct Scarlet 2 G N supra; Setacyl Direct Red B supra; Setacyl Direct Violet 2 R supra (patent applied for); Setacyl Direct Discharge Blue 2 R supra (patent applied for); Setacyl Direct Discharge Blue G supra (patent applied for)*—a range of discharge colors for acetate which are said to possess particular interest inasmuch as the range has been completed by the production of dischargeable components. Setacyl Direct Discharge Blue G supra is said to be particularly outstanding on account of its greenish shade and very good shade in artificial light. The fastness properties correspond to those of Setacyl Direct Blue 2 GS. The 2R supra brand is redder and gives good yield but the shade is inferior in artificial light. Both are said to possess excellent fastness to gas fumes. Setacyl Direct Yellow 5 G supra is said to be a clear, brilliant and lively canary yellow of very good fastness to light. In combination with the Discharge Blue G supra it is said to be possible to obtain very bright, clear and dischargeable greens. As all the new dyestuffs can be dyed in combination with one another it is possible with the assistance of the range to obtain all types of dischargeable combination shades by suitable selection. Circular No. 942.

# OPEN FORUM

**Rules under which this department of the REPORTER is conducted are as follows:**

**1. Anyone who has a technical problem on which he would like advice may submit it to the Reporter and it will be published in the first available issue.**

**2. Any reader who feels that he has a solution of the problem may forward his reply to us and if we feel that the reply is suitable it will be published in a succeeding issue.**

**3. For each such reply published the Reporter will pay a minimum of $2.**

**4. In case there is more than one answer to the same question, the one covering the subject in the most complete and authentic manner will be published, or if two answers are sufficiently different both will be published. If two answers are considered equally good, the one first received will be given priority.**

**5. The Reporter will assume no responsibility whatsoever for the accuracy of the answers submitted—it is simply offering a vehicle for the public expression of its readers' opinions.**

**6. Both the questioner and answerer must send in his complete name and address. When requested we will publish only the initials or other identifying insignia.**

### Unanswered Question

**40**—Can creases in knit goods for underwear be eliminated? The fabric is kier boiled in a vomit kier for twelve hours under twelve pounds pressure, then given a hypochlorite bleach and finished by passing through a mangle.

These creases appear before going through the mangle, and the mangle does not press them out. Information or suggestions will be appreciated.—**W. H. F.**

### New Question

**41**—We would like to know the general principles of the process used in rendering silk transparent. Inasmuch as the process is to be used on rather heavy goods, we believe that one of the newer methods whereby thin layers of fiber have been rendered absolutely transparent is necessary. Information along this line which any of your readers are inclined to give will be highly appreciated.—**Library.**

### NOTICE TO READERS

**In addition to above questions, you are also invited to send in answers to previous questions which have already been answered if you are of the opinion that you have additional information to offer.**

## CLASSIFIED

**The rate for "Position Wanted" advertisements in this column is 2 cents a word—with a minimum of 50 cents per insertion. For all other types of advertisements—i.e., help wanted, machinery or supplies for sale—the rate is $5.00 per column inch or less per insertion.**

WANTED: a three-color printing machine, 24" rolls, with all accessories, suitable for laboratory use. Must be in good condition and at a reasonable price. Reply Box No. 943, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

WANTED FOR TEXTILE SPECIALTY AND FINISHING PRODUCTS: Long established manufacturer requires men experienced in sales development and demonstration work. Dyestuff knowledge desirable but not essential. State education, experience and other qualifications. Write Box No. 944, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

POSITION WANTED: Chemist capable to take charge or supervise the preparation, dyeing and finishing of rayon, acetates, cross-dyes,—Special experience in crepes—Cotton experience and original research work. Write Box No. 945, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

TEXTILE CHEMIST AND COLORIST: Phila. Textile School graduate, age 29, married. At present employed as chemist for dyestuff and specialty jobber. Desires change to a dyehouse. Qualified for color matching, dye testing, etc. Will go anywhere. Write Box No. 946, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

CHEMIST WANTED: Well known sulfonated oil manufacturer has an opportunity for a chemist possessing necessary experience and knowledge of mineral oils for lubrication and emulsions for textile trade. Write stating age, education, experience and salary expected. Box No. 947, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

ASSISTANT DYER WANTED: Finishing Plant wishes to contact young man with experience on Vats, D. & D. and Naphthols. All applications will be treated strictly confidential. State experience and salary expected. Box No. 948, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.